

ATTITUDES TO WORK¹

A FIELD STUDY OF BUILDING OPERATIVES

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I. INTRODUCTION

(1) *Purpose and scope of the investigation*

The purpose of this investigation was to obtain information about building operatives' attitudes to their work and to working conditions, and to ascertain which were the strongest incentives to working. The investigation was intended to be a pilot survey for a later and more detailed study of the influences that seemed of outstanding importance.

Most of the results given below are based on interviews with 400 operatives, from fourteen sites on which traditional brick houses were being built. In the Appendix are shown the approximate number of men employed on each site at the time of the investigator's visit, and the proportion interviewed, subdivided according to trades. Interviews were also conducted on three sites where non-traditional houses were being erected, but the results of these are not, except where indicated, included in the present report.

No attempt was made to take a true cross-section of the operatives throughout the industry, and no claim is made that the sample is representative of the industry as a whole. However, in that section of the industry in which the investigation was carried out the results indicate certain trends and suggest directions in which experiments and changes in policy are likely to be effective. Neither the operatives employed in very small firms nor those engaged on repair and maintenance work were included, and it is possible that the sample studied should be regarded as a selected group in certain respects. The fourteen traditional sites visited were in different geographical areas, six in London or the Home Counties, two in the Midlands, two in the north of England, one in the south, and three in Scotland.

(2) *Method of investigation*

Before any interviews were held, the proposed investigation was fully discussed with the manager of the firm or authority concerned and permission was obtained to visit the site. Contact was then made with the general foreman on the site, and arrangements made with him so that the investigation disturbed as little as possible the organization of work. The proposed investigation was also discussed with the site representatives of the Trade Unions.

¹ This investigation was carried out in the summer and autumn of 1946. Since that time, conditions in the building industry have changed considerably and further research is needed into the effects of present conditions on the attitudes of the operatives.

Each operative was interviewed separately and in private, usually in a hut or mess-room lent for the purpose. The interviews usually lasted about 30 minutes and were made as informal and friendly as possible. The form used for recording the interviews was standardized for convenience in analysis. The interviews covered the five broad topics of:

- (1) The job (previous experience, attitude to job, ambitions, etc.).
- (2) Working conditions (hours, midday meal, security of employment, etc.).
- (3) Wages (including opinions on payment by results).
- (4) Home life (domestic problems, transport, etc.).
- (5) Health.

The reception of the investigators by persons at all levels of the industry was extremely friendly and helpful. The operatives who were interviewed were, almost without exception, frank and talkative and many of them expressed their approval of the investigation. A number of men returned of their own accord to volunteer further information. The assurance was given to all concerned that this was an impartial and scientific inquiry, and that in any report that might later be written neither firms nor individuals would be mentioned by name. The fact that both investigators were women was possibly an advantage in that this emphasized their detachment from the industry.

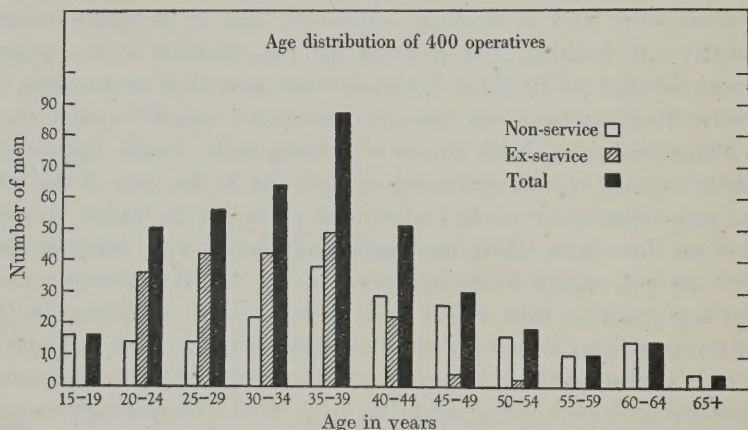


Fig. 1.

II. RESULTS OBTAINED

Although the results are probably accurate with regard to the sites selected, they do not warrant elaborate analysis. A straightforward summary of the information obtained on each of the topics dealt with is therefore given in this section, and discussion and interpretation of some of the factors that, in the investigator's opinion, are of outstanding importance, will be attempted later.

(1) *Trades and ages of operatives interviewed*

(a) *Trades.* The number of operatives interviewed on each site, according to trades, is shown in the Appendix. The method of selection was to take roughly the same proportion of each trade on every site. It was decided to interview a slightly smaller proportion of general labourers than of tradesmen. The principle that the names of the men to be interviewed must be selected by the investigator was always adhered to.

(b) *Ages.* The age distribution of the operatives is shown in Fig. 1. The distribution of

non-Service men over the whole age range from 15 to 65 is effectively identical with that of the male population at large, and the marked decrease in total numbers in the higher age groups is due to the fact that 49.25 % of the men were ex-Service men, the great majority of whom were under the age of 40. (This high proportion of ex-Service men may be partly due to the fact that men were able to obtain the earlier 'B' release to enter the building industry.) The proportion of the ex-Service men in each trade was approximately the same (about 50 %) but the proportion of older men varied slightly according to trades. For example, 11.4 % of the joiners were aged 45 and upwards, whereas the corresponding figure for general labourers was 29.3 %. A point of interest is that a significantly high proportion (30 %) of tradesmen's labourers falls in the under-25 age group. A number of tradesmen's labourers said that they were anxious to pick up a trade, but, for various reasons, could not take a recognized training course or were not willing to do so. However, the evidence is not adequate to support the conclusion that this is the determining factor for the higher proportion of younger men observed in the tradesmen's labourers group.

(2) *Attitudes to work*

(a) *Reasons for entering the building industry.* Of the 262 tradesmen interviewed, only thirty-three men had had experience of any jobs other than those in the building industry. The great majority had started to learn their trade upon leaving school, and their reasons for so doing were as shown in Table 1.

Table 1. *Reasons for entering the building industry*

	Tradesmen			Labourers	
	No.	%		No.	%
Family tradition	109	41.6	Best opening at time	60	43.5
Best opening at time	50	19.1	Open-air life	27	19.6
Boyish interest	48	18.3	For a change; better job	16	11.6
Open-air life	24	9.2	Family tradition	10	7.3
Healthy life	8	3.0	Healthy life	5	3.6
Helped by friend	7	2.7	Directed	5	3.6
Other reasons	16	6.1	Near home	5	3.6
Total	262	100.0	Other reasons	10	7.3
			Total	138	100.1

There were some differences between the trades in the numbers of men giving each of the reasons listed. For example, 56.5 % of the bricklayers gave family tradition as their chief reason, while the corresponding figure for joiners was 24.3 % and for the other trades 32.3 %. The reason given most often by the joiners (by 34.3 % of them) was that of boyish interest, whereas only 6.5 % of the bricklayers had taken an interest in their present occupation while still at school. This seems to indicate that if bricklaying were taught in the schools, as a craft or a hobby, the number of young entrants to this trade might increase. There are significant differences between the percentages of tradesmen and labourers giving the same reason.

(b) *Opinions of tradesmen on their training.* The majority of the tradesmen (76.7 %) were satisfied with the training received. Of the dissatisfied men, almost half said that they had had no course, or an incomplete course, of technical training, and a number criticized the system of night schools. Others spoke of their bad teaching as apprentices, saying they were made to spend too much time doing odd jobs and being 'tea boys'. On the whole, however, there were few criticisms or suggestions for improvement.

(c) *Attitudes to their specific jobs*: (i) *General attitudes to the job*. The great majority of the operatives liked their jobs, many of them giving detailed and sometimes eloquent reasons for so doing. Their attitudes to their jobs were classified as shown in Table 2.

Table 2. *Attitudes to their specific jobs*

	Definite liking		Moderate or qualified liking		Definite dislike		Total	
	No.	%	No.	%	No.	%	No.	%
Tradesmen	215	82.1	29	11.0	18	6.9	262	100.0
Labourers	96	69.6	37	26.8	5	3.6	138	100.0
Total	311	77.75	66	16.5	23	5.75	400	100.0

(ii) *Reasons for liking the job*. Each operative was asked, "What do you like about your job?" and "What do you dislike about it?" The answers do not, of course, give a complete picture of the men's reasons for liking or disliking their jobs, and many additional reasons were given or could be inferred from replies to other questions, such as those dealing with working conditions. The replies to the direct question, however, probably indicate the matters uppermost in the men's minds and it has been thought better to list these separately rather than to attempt a composite summary. Of the 311 men who said they definitely liked their jobs, fifteen men (twelve of whom were labourers) could not give any specific reasons for their statements; and thirty-nine of the eighty-nine men who were less satisfied also gave no instances of aspects of the job that they liked. The remaining 346 men gave a total number of 525 reasons for liking their jobs. These reasons, in order of frequency were as shown in Table 3.

Table 3. *Reasons for liking the job*

	% of total no. of reasons
Open-air life; healthy; sense of freedom	34.5
Likes actual job; using intelligence, skill, etc.	24.7
Likes variety of work	12.0
Job is convenient means to an end	4.6
Likes companions; good tradition	4.2
Likes conditions; security; pay	4.2
Used to it; knows no other	4.0
Job is of social importance	2.9
Simple, clean work	2.1
Miscellaneous reasons	2.1
Likes control and responsibility	1.9
Better than former job	1.5
No bullying; good conditions on direct labour	1.3

The outstanding facts, if these figures are analysed according to trades, are few. A larger percentage (36.6%) of the reasons given by bricklayers than of those expressed by joiners or by other tradesmen (24.0 and 24.7%) were connected with liking for a free, open-air life. Apart from this difference, the group was homogeneous. The reason given most often by the labourers was liking for the open-air life, but with labourers, as with tradesmen, pleasure in doing the job ranked second in importance, although in the case of the labourers the second figure was relatively small (12.2%). A great variety of other reasons was also given, here collected under only a few general headings. These reasons are of interest in that they indicate incentives to work that at present operate only in the case of a few individuals, but might become of more general significance if intelligently encouraged.

Some verbatim remarks that illustrate some of the reasons listed above, were:

"Mine is a job on its own. Not everyone can get an eighth of an inch off 57 feet long of glass." "A man can pick up any other trade in 12 weeks, but plumbing is too varied and skilled. You must know about so many materials to be a plumber—iron, lead, copper, etc." "I like the name electrician. It sounds good." "There's better dignity in the building trade now. Before the war you didn't like to tell girls you were in a building trade, but now it's important." "I feel that men's lives depend on my work (scaffolding). The more ticklish a job the better I like it." "I like being a labourer as we have less responsibility than tradesmen." "I like using my hands. I like good tools. I get satisfaction out of seeing a good job that I have done." "I like doing first class work. I don't like the present work except that you feel it is something good as well as for a living." "I like making a place look decent. I want a house of my own so I am interested." "There's a sense of having achieved something when you see a building which you have worked on." "There's a good crowd in the building industry. It's much better work now, under direct labour." "I like being outside and not feeling shut up." "I like the open air. I like laying bricks and the harmony among your mates."

(iii) *Reasons for disliking the job.* It is often found that people talk much more readily and fully about their dislikes than about their likes. Yet only 47% of the men interviewed made any reply to the question "What do you dislike?" as compared with 87·5% to the question "What do you like?" It is possible that this question directed the men's attention to the job itself, rather than to conditions, although it will be noted that most of the comments relate to conditions and not to actual operations. The replies to other questions in the interview show that discontent about many aspects of the working environment (such as wages, lack of canteens, transport, etc.) was far more intense and widespread than the replies to this question alone would indicate. It is of interest to note that there was apparently very little transference of discontent to the job itself, and there is little doubt that this fact strongly reinforces the conclusion that the positive liking for the job in itself was very powerful.

The 181 men who replied to this question gave 237 reasons for disliking their jobs, which are shown in Table 4.

Table 4. *Reasons for disliking jobs*

	% of total no. of reasons
Low wages	16·8
General bad conditions; worse than Army	11·9
Winter weather	10·2
Job too unskilled, too monotonous	9·3
Management or fellow workers disliked	8·4
Uncertain wages; no overtime; unfair pay	7·6
Miscellaneous	7·2
Rough and dirty work	6·3
Holidays not paid	4·6
Job needs no initiative	4·2
Transport and travelling allowances bad	4·2
Wants other type of work	3·8
Future too uncertain	3·8
Too few labourers	1·7

Some verbatim comments were:

"I dislike being a labourer and therefore looked down on as an imbecile. It gives me an inferiority complex. Girls draw away from you in buses and say, 'He's only a labourer'." "I dislike building old-fashioned houses. Plans which were drawn up fifteen years ago are being used now. You can't have any heart in that sort of work." "I'd prefer a regular job. This is too much of a struggle when you're getting on in years." "During the war I had a job with the G.P.O. which was secure. I knew how much I was going to draw. I'd like to get back to it." "The wages aren't enough to live on. I have slaved for fifty years and now have only one suit. Is that enough out of life?" "There are not enough labourers here. My skin's wore off through handling too many bricks." "It frightens me to think I'll do nothing but lay bricks

all my life, though I would like to do something to improve conditions here." "I've rued the day I came into building. I have often only averaged £1 a week in a year. It's always been a struggle, though it's better now—if it lasts." "You often don't get a fair chance if the foreman doesn't like your face." "There's too much class distinction between labourers and tradesmen." "I don't like the attitude of the bricklayers to the trainees." "Too many sons and brothers get the foremen's jobs." "I don't like the way houses are distributed. I want a house myself and it makes you lose heart."

(iv) *Preference for type of work.* About half the men expressed a preference for some particular type of work, the great majority preferring large buildings such as churches, schools or cinemas. As one of these men said, "I like class work best, like churches. You get a variation of work and it's on that work that real skill counts." On the other hand, many men felt that in the present emergency they preferred to build houses. For example, a bricklayer said, "You don't get the class of work as one did years ago, like Gothical arches, but I feel the present work is vital so I am glad to be doing it." Another man, a joiner, who had previously had various factory and repair jobs, and at the time of interview was on his first housing contract, said, "I prefer houses. I got a great kick when I saw the first lights go on in the first house that I helped to put up, and thought of people living in it and that people would live in it when I am dead."

(d) *The ambitions of the operatives.* The ambitions of the operatives were as shown in Table 5.

Table 5. *Ambitions of 400 operatives*

Ambition	Tradesmen		Labourers		Total	
	No.	%	No.	%	No.	%
Promotion or progress	88	34.1	29	20.4	117	29.25
Other job in building	30	11.6	15	10.7	45	11.25
Different job	19	7.4	18	12.6	37	9.25
Go abroad	14	5.4	4	2.8	18	4.5
Get job with a house	2	0.8	—	0.0	2	0.5
See housing nationalized	—	0.0	1	0.7	1	0.25
No ambition	105	40.7	75	52.8	180	45.0
Total	258	100.0	142	100.0	400	100.0

This analysis of ambitions supports conclusions reached elsewhere on the desirability of offering better opportunities for progress and promotion in the industry, and shows that this ambition or its lack differentiates the tradesman from the labourer. The high percentage of men in the category called 'No ambition' includes many men who said, "It's no good having ambition". A number of men, including some in their early twenties, said they were too old to start learning anything better or different. In spite of this possibly justified resignation, 20.4% of the labourers wanted to learn a more skilled job, and it will be noted, that the proportion of both labourers and tradesmen who wished to leave the industry for a different type of work was only 12.6 and 7.4% respectively. Just under half of the men with ambitions felt hopeful of being able to realize them.

(3) *Attitudes to working conditions*

(a) *Opinions on hours of work and rest pauses:* (i) *Hours of work.* With the exception of forty-two men who had the option of working overtime at the time of the interview, most of the operatives were working a 44-hour week. 50% of the men said they were satisfied with their working hours, 39.5% gave qualified approval, 6.5% were definitely dissatisfied and 4% gave no opinion. Most of the comments made were about the dislike of working on Saturday mornings, 20% of the men saying they wanted a 5-day week of 40 hours.

A further 7.5% said they would like to keep the 44-hour week but without working on Saturdays. No man mentioned income tax in this connexion, although the investigator was frequently told by foremen that P.A.Y.E. was the reason for the relatively high absenteeism on Saturdays. The results of this investigation give no support to the widely held theory that P.A.Y.E. induces reluctance to work longer hours. The desire to work overtime was mentioned by 14.5% of the men and many others said they would welcome a chance to earn higher wages but felt that the acceptance of overtime would jeopardize their chances of obtaining a rise in hourly rates.

Some comments on the hours of work were:

"Saturday morning is a waste of time. You would get as much out of the men if they worked a 40-hour week." "I would like overtime to make up wages. Housing is priority, and should we be allowed to go home with school children?" "Overtime never improves production." "They're screaming for houses and yet won't give us overtime. Failing that, give a living wage so that we can educate our children." "Coming in for half a day is waste of time, money and transport." "I don't come in on Saturday morning because I live so far away. It takes me one-and-a-half hours if the buses are bad."

(ii) *Rest pauses.* On every site visited the men had a tea break in the morning. On some sites a whistle was blown and the men went to the mess-hut, while on others tea was taken round to the men at their places of work. On only one site was the men's pay stopped for the 15-minute break; this caused much discontent. Many reasons were given for the almost universal appreciation of the tea break and there was a general feeling that it should be officially authorized by the employers. Many men were convinced that a recognized break of 10 or 15 minutes resulted in an increase in total production and that it caused far less working time to be lost than would the surreptitious "brewing" that was the probable alternative. On the site where overtime was worked a number of men said that they felt the afternoon spell of work too long and that a short break at about 4 o'clock would give them renewed energy.

Among comments on the tea break were the following:

"They're trying to stop the morning tea break. If they do, the men will go back to the old methods of dodging behind walls for tea breaks and lose more time." "The tea break is good. We used to have to steal time for tea." "I think the tea break could be better organized. The men take too long. I don't want to see it done away with." "If they stop the morning break it will cause trouble." "Morning tea break is the finest asset to the industry. Even if it was not allowed it would still be taken." "Dinner is the only official break. Morning and afternoon tea breaks are treated as a favour. It is all wrong." "I wouldn't have come here if I'd known I'd lose quarter-of-an-hour's pay for the tea break." "I don't like sneaking the tea break, however openly. It should be official." "We had to threaten a strike to get the tea break."

On ten sites the dinner break was 1 hour, on one site it was three-quarters of an hour and on six it was half-an-hour. There were few comments on the length of time of dinner break preferred. Of those with an hour's break, 9.5% thought this too long, saying that they grew bored or sleepy. On the other hand, 6.1% of those with a half-hour's break would have preferred it to be longer. Some of the men's remarks were:

"Half an hour is long enough for lunch, though I suppose an hour is given for health reasons." "We should have only half an hour for dinner. I go to sleep when we have an hour and feel muzzy in the afternoon." "I don't think half an hour is enough for your dinner. It's too much rush with your food." "The dinner break is too short. We ought to have an hour."

(b) *Attitudes towards being kept waiting for work.* On the traditional sites, there were few comments about being kept waiting for work. 7.25% of the men said they were held up occasionally, and 3% said they were frequently held up. The explanation most commonly

given was that this was due to shortage of materials, but some stoppages were said to be due to unskilled labourers, or to bad organization of the flow of work. All the men who complained of being kept waiting said that they found it demoralizing, although, if they realized that it was inevitable and not due to bad management, they tried to resign themselves cheerfully to finding other jobs to fill in the time. On the non-traditional sites there were almost twice as many complaints. They again referred for the most part to shortage of materials, but one man said, "The fault lay with the designers. It is too late to alter it on this job. It is not the organization. The general foremen have too much to contend with."

(c) *Attitudes towards fellow-workers and supervisors: (i) Fellow-workers.* On all sites there was a feeling of group solidarity and of good companionship among the operatives, or, at least, among members of the same trade or gang. A few instances were observed of disunity among the operatives, as, for example, between trainees and ex-Service men and the rest; but the attitude of one group to the other seldom showed feelings stronger than tolerant disapproval. On only one site, where a small group of men were said to be deliberately fomenting discord, was there any marked inter-operative hostility. The great majority of the total number of operatives (71 %) said they definitely liked and got on well with their fellow-workers and only 3.75 % expressed dislike or disapproval. The figures, separately given for tradesmen and labourers, are shown in Table 6.

Table 6. *Attitudes to fellow-workers*

	Favourable		Moderately favourable		Unfavourable		No opinion		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Tradesmen	196	74.8	57	21.7	5	1.9	4	1.6	262	100.0
Labourers	88	63.8	40	29.0	10	7.2	—	0.0	138	100.0
Total	284	71.0	97	24.25	15	3.75	4	1.0	400	100.0

Some comments were:

"We all get on well here. Most of them have been in the Forces and are used to mixing." "They're first class." "A happy bunch. No contrary ones." "They're a good, sociable crowd of lads." "Very good types. No pent up feelings. You can use abusive language and get rid of pent up feelings. In factories they gossip instead." "We work as a body. There's terrific friendship in our gang due to its being a small gang." "There are a lot of slackers in the trade now who give a bad example." "Chaps sneak into trades before serving their time. It shouldn't be allowed." "One man works his heart out. Others don't care, due, I think, to poor supervision." "There's too much class distinction between tradesmen and labourers." "Some are old and slow, but leave them alone and they're O.K." "Lads who have had to go through a long training are idle while trainees are in work. It's wrong." "The B release men give trouble, hanging out for 6 months. They don't care if they work or not. The A men are very good." "We despise the non-Trades Union workers."

The majority (77.5 %) of the operatives interviewed were members of their Trade Union. The men were not questioned about their attitude to the Trade Unions, but a number of comments about the Unions were volunteered. It is impossible to say how representative these comments are, but it may be of some interest to record their nature. Some of the men expressed loyalty to the principles of the Unions, for instance over the question of payment by results, making comments such as, "Payment by results would not be fair to all, as the Trade Union is," and, "Being a Trade Unionist, I don't approve of payment by results." On one small site only were there no Trade Union members, and on that site the bricklayers were being paid by results and the labourers were receiving a fixed

weekly bonus. There was no indication that any operative regarded the Unions in any other but the traditional way, namely as a fighting instrument for achieving better conditions. Such criticisms as there were of the Unions were directed towards their supposed failure to fight adequately in the men's interests. For example, one man said, "There is little faith in the Trade Union, especially among ex-Service men. The Union haven't done their job. It looks as if they have no power unless the men threaten to strike." Or, from a shop steward, "The Trade Union delegate told the Corporation months ago about transport. But you have to fight all the time. No one wants to strike but it's the only way to get anything done." On another direct labour site, an operative remarked, "The Corporation does not try to improve conditions and are hand in glove with the Trade Union. No one is on the men's side." Another man expressed appreciation of the investigation as a means whereby some improvement might be effected, and wished that there were more of such inquiries; he added, "To get the Trade Unions going you have to be perpetually moaning." On one site considerable, if possibly temporary, anti-Union feeling arose as a result of the Union's official protest against the dismissal of two men who had been proved to be guilty of obtaining wages on false pretences: a number of men made remarks such as, "It isn't just. It brings the Unions into disrepute." And the behaviour of the employers, who acceded to the Union's request to reinstate the men, was strongly criticized by a number of shop stewards and Union members. One shop steward, a man of over 60, said, "I've been a keen worker for my Union all my life, but this sort of thing makes you lose heart. The Union officials seem out of touch with the men on the job, and if you write to them they just pass the buck. It's very discouraging."

(ii) *Foremen*. Only a small percentage (11.5%) of the operatives had a definitely unfavourable attitude to their foremen, although on some sites the proportion was much higher than on others. From Table 7 it will be seen that the tradesmen showed more positive approval than the labourers, and the proportion of labourers who could not or did not express any opinion was more than double the corresponding proportion of tradesmen. However, the apparently small percentage (11.5%) should be considered in conjunction with the number (37.5%) expressing some criticism or dissatisfaction with their foremen. In view of the extreme importance of foremen in the industry the fact that almost half the operatives were in some measure dissatisfied is of considerable significance.

Table 7. *Attitudes to foremen*

	Favourable		Moderately favourable		Unfavourable		No opinion		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Tradesmen	133	50.8	92	35.1	29	11.1	8	3.0	262	100.0
Labourers	53	38.4	58	42.0	17	12.3	10	7.3	138	100.0
Total	186	46.5	150	37.5	46	11.5	18	4.5	400	100.0

The effect of the foreman on the morale of the working group was realized by many of the men and, in some cases, was discussed in some detail. For example, a bricklayer said, "A foreman is like a sergeant-major. When I was in the Army I learnt one thing, that if you have a good sergeant-major you have a good unit. The men have to go through him to get to the higher authorities, and if he's approachable and interested in the men you get a good spirit all through the unit. Now our foreman only behaves fairly decently because he doesn't want to lose his men. If he had a chance he'd go back to pre-war bullying."

The following comments have been selected so as to show which characteristics of the foremen were, in the operatives' opinions, most important:

"He doesn't know his job, and argues. I have no respect for him." "Our general foreman is not experienced enough. He doesn't know what's wanted and has no tact with the men." "There should be more harmony between the general foreman and his men. He is out for his own ends." "He's inclined to give jobs to his particular pals. There should be set standards or rules before you become a foreman." "He tries to rush us and starts a new job before we have finished the old. The result is we're inclined to slack when his back is turned." "There are too many fingers in the pie. Too many men give us orders." "He'd pass any bad work if we'd do it. All he's interested in is getting a lot done for show, so that he can get the credit. But we don't let him have a chance, because we do good work and he dare not tell us not to." "You can't trust him. He'll say to Jack, 'I'd pay Bob off if I had the chance', and you know that he'll go and say the same about Jack to Bob. But the men get on with their work and don't bother much with him." "He hasn't a good manner. One minute blushing, the other cringing. I think he has an inferiority complex. He is generally disliked." "He used to be like the Gestapo, always hanging over you, until a good few of us rowed with him." "He's loyal to the employer and good to the men." "He's very good and doesn't pry. We try and give him good results." "Our foreman organizes well and nothing holds us up." "He's excellent. More like a workmate, not high and mighty." "Ours is very good, though most are pains in the neck."

(iii) *Management.* In Table 8 the attitude of the operatives towards the management is summarized. It will be noted that a large proportion of men (30.5%) expressed no opinion. Many of the men included in this category made remarks such as "I never see them" or "There is no contact". Whether these statements imply a criticism or not, the fact that contact with the management was lacking is in itself important. However, only men who made specific criticisms or complaints are included in the 'unfavourable' group (15.5%). Men who made only implied criticisms of the management, such as complaints about canteens, welfare or transport arrangements, are not included in the dissatisfied groups in this table.

There was considerable variation between the sites, and also between the direct labour and the private contractors' sites, in the proportions of satisfied and discontented men.

Table 8. *Attitudes to management*

	Favourable		Moderately favourable		Unfavourable		No opinion		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Tradesmen	56	21.4	89	33.9	44	16.8	73	27.9	262	100.0
Labourers	21	15.2	50	36.2	18	13.0	49	35.6	138	100.0
Total	77	19.25	139	34.75	62	15.5	122	30.5	400	100.0

Most of the comments critical of the management referred to matters such as lack of personal contact between management and operatives, which resulted in ignorance and suspicion on the part of the operatives of the functions of the management. The management's methods of dealing with grievances and their attitude towards the Trades Unions were other causes for complaint. Many critical comments were made by the operatives on their lack of opportunity to make suggestions about improving methods of work and production, and on the lack of information from the side of the management about the progress of the job as a whole.

"There's not enough contact. We feel the office staff might pass the time of day when they come on the job." "I believe we've got a labour manager, but I don't know his name and have never seen him." "We never see the management and never know what they do." "There's no interest in this site from Head Office. We have had three different squads of bricklayers in three months. Labourers and materials

are short." "The management are always floating around. We never know what they do but suppose they are being useful." "There are too many walking about in hats. Why?" "We should have competent men in high positions. There are too many men who only know the theory in charge." "The Manager is out for himself and not for his men. He is too selfish." "They will drag out the job because they are paid well." "You can get no satisfaction out of (the Head Office). They pass the buck and you get nowhere. I don't doubt that the General Foreman forwards our complaints but you never hear any more and nothing is done." "The management is not much good. They make promises to the men and then don't keep them." "They pay some men 1*d.* an hour more to rush the others on. It's against T.U. principles." "They're scared of the Unions so there is no discipline. Wrongdoers ought to be punished." "Plenty of men have thought out ways of making work easier and quicker. I myself thought of a very simple mechanical way of raising bricks. But it's no good putting any ideas forward. They don't think any idea any good unless it comes from the top." "A suggestion box would be a good idea. It was a success in other industries during the war so why not here?" "I wish they had a suggestion scheme. Of course I expect only one in a hundred suggestions would be any good and be accepted, but that wouldn't matter because it would be an encouragement to everyone." "The Corporation are opposed to Joint Production Committees. They would assist output and give a chance of settling grievances more easily. The Corporation are standing in their own light." "There should be more co-operation between the foremen of the different trades and between them and Head Office. It would improve production" (an operative's, not a foreman's comment). "I'm sure our squad is laying an average of about 800 bricks whatever the Corporation says. They never give us the facts or tell us how they get their figures." "It would be more interesting if they'd only tell us how the job is progressing." "I don't want to be paid by anything but hourly rates, but I should like a daily target to aim at. It would be more interesting." (From a foreman) "I often wish I could go round and say to the men, 'You did a good job last week' or 'We're behind schedule so we must make an effort', and show them a progress chart. It would encourage them. But the Corporation are opposed to any kind of target because of the Unions."

The comments expressing approval were briefer and less explicit, and usually consisted of "good" or "very good: we've nothing to grumble about". A few men volunteered reasons for their attitude, such as:

"My firm has a personal interest and looks after individuals. I wouldn't work for another." "The management is very good here. You can speak to the Agent and he's ready to listen to any complaint." "Very good. The Agent is a very fair man."

(d) *Canteens and feeding habits.* The purpose of including questions about feeding habits was to ascertain whether the facilities, or the lack of them, for the midday meal gave rise to dissatisfaction and affected the operatives' general attitude to their work. No attempt was made to secure evidence as to the type and amount of food eaten, and the questions on food were regarded as of very secondary importance to the main purpose of the interviews.

Of the seventeen sites visited (i.e. fourteen traditional and three non-traditional sites), eight had some provision for a cooked meal for the operatives. On these eight sites with canteens 114 men used regularly the facilities provided. Of the rest, thirty used the canteens occasionally; 148 never used them. Of the regular users, seven made no comment. Seventy-four thought the food good; four said the canteens were overcrowded; four found them too expensive. Of the remainder, twenty-two said food or service was bad, and three remarked that the quality varied.

Nine sites had no provision for a cooked meal. The comments of the operatives on these sites showed that many of them find it difficult and unsatisfactory to bring sandwiches daily. A number of men remarked that it was "hard on the wife". This statement should probably be interpreted to mean that the wife found it a problem to provide suitable sandwich fillings, but it may in some cases have meant that the men considered it unfair that they should have to eat the wife's rations of cheese, margarine, etc.

Fifty-five men on sites without canteens offered no comment. Of the 115 men who did comment on their food habits, sixty-six said they would like a canteen and sixty said they

found it difficult to manage. Four men said they were often hungry and six said they often had nothing but bread and margarine. Ten men expressly asked for more cheese; two remarked that their food was boring. Neighbouring cafés were used by thirteen men, who were satisfied with them. Three men found them too distant to visit. The lack of tables in the huts was pointed out by one man; five actually preferred bringing sandwiches. When asked what they did about midday meals, 104 men said they brought their own sandwiches; thirty-three managed to get home, and twenty-nine visited neighbouring cafés.

In the opinion of the investigator, the question of the provision of midday meals for operatives, whether by additional canteens or by extra rations or by other methods, is important and urgent. There is little doubt that many building operatives feel that they are unfairly treated as compared with workers in other industries, and this cause of dissatisfaction possibly intensifies discontent due to other causes. The question of feeding facilities is connected with the problem of overtime, and with that of fatigue. Comments to the effect that the fatigue men felt was due to inadequate food were frequent on the sites visited. One site, on which the canteen was excellent and carefully managed, was a particularly happy and contented site. It is not impossible that the two facts were connected.

(e) *Opinions on working clothing.* The question on clothing was framed in such terms as, "How do you manage for working clothes?" The men's replies were recorded verbatim, and no further questions on clothing were asked. Thus the factual replies, such as those relating to the use of Forces clothing, cannot be regarded as completely representative. About 40% of the men were classed as 'Satisfied'; this group included all those who did not volunteer complaints, and who made remarks such as "I can just about manage." It is highly probable that many of these men, if questioned more fully, would reveal that they had practical difficulties about clothing, even if these difficulties did not give rise to marked discontent or worry. The attitudes labelled 'Satisfied' and 'Dissatisfied' are not necessarily closely related to the actual state of a man's wardrobe, but are affected both by his temperament and by his attitude to other topics discussed by him during the interview.

The factor most closely associated with satisfaction was previous Forces service, 60.4% of the ex-Service men, as compared with 21.2% of the non-Service men, being 'satisfied'. With the possible exception of the joiners, who showed a slightly higher proportion of satisfied men, no marked differences were shown between the trades. It is possible that dissatisfied ex-Service men were those who had had earlier releases from the Forces and thus had used up their Forces clothing, but no details of date of release were obtained.

The men made a number of comments on specific requirements, but, as will be seen from the following remarks, the desire for more or better working clothes was based not solely on considerations of convenience or comfort but also on those of social convention and prestige:

"It is hopeless to try and cope. You cannot look anything but a tramp." "I can barely manage on the coupons. As long as you have decent overalls you never need lose your self-respect coming to work." "Oilskins and boots have been issued on this site. We have had to fight for them." "Bricklayers should be supplied with Wellingtons. We are on footings and foundations now and it is very muddy." "Lime and cement rot my boots and clothes." "I use one boiler suit in four months owing to cutting bricks on my leg. Boiler suits should be coupon free. The average life of boots is nine months, with care." "Clothes are

the hell of a lot of trouble. I use blue overalls and have had to use the wife's coupons." "Trousers only last three months, as I am always on my knees." "I have to beg off relatives for old coats and things which would be too shabby for an office. I get through such a lot of clothes so quickly." "We cannot get enough working clothes. Could not old battledresses be sold cheaply to us and army boots too?" "When Service kit is gone it will be very difficult." "There is not enough money to buy clothes even if we had coupons."

(f) *Attitudes towards security of employment.* Table 9 shows the proportions of men (including the sixty-two men on non-traditional sites) who felt that their prospects of future employment were secure, moderately secure, or insecure. The figures given are based mainly on the replies received to the direct question, "What do you feel about your own security of employment?" However, the replies have been to a certain extent interpreted in the light of relevant remarks made in other contexts during the interviews. In the category 'moderately secure' are included fifty-two men who in their replies to the direct question said that they felt a good sense of security, but who made it quite clear by their remarks on other topics that they were thinking only of the near future and were much less optimistic about the long-term prospect. Some of these men, for example, said that what they disliked about their job was its insecurity, others said they would not wish their sons to enter the industry because of the improbability of regular employment, while others were emphatic that they regarded a guaranteed week as a far more important objective than a rise in hourly rates of payment. The extent to which the remaining men in the 'secure' category were taking either a short-term or a long-term view cannot be determined with certainty. It will be noted that a higher proportion of labourers than of tradesmen felt secure. If a comparison is made of the proportions of men who felt secure in the different age groups it is found that, with the exception of those under 25 years old, there is a slight increase in the numbers of men who feel secure with each increasing age group. In the oldest group, those of 55 years and over, the percentage is as high as 74.2%, as compared with 55.1% for those between the ages of 25 and 34. As has already been said, the numbers of older men were small (only thirty-one men out of a total of 462 were 55 or over) but it seems possible that their feelings were influenced by the good short-term prospects and, as some of their remarks indicated, by the provisions for sickness and old age. In the investigator's opinion, the figures of the numbers of men in the 'secure' category are probably too high in all age groups, and a more detailed inquiry into this question might reveal whether this is so or not. However, even if the figures given be considered reliable, it is noteworthy that at the present time as many as 40.3% of the operatives expressed some degree of feeling of insecurity.

Table 9. *Attitudes towards security of employment*

	Secure		Doubtful		Insecure		No opinion		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Tradesmen	159	53.4	88	29.5	51	17.1	—	0.0	298	100.0
Labourers	114	69.5	24	14.6	23	14.0	3	1.8	164	99.9
Total	273	59.1	112	24.3	74	16.0	3	0.6	462	100.0

Most of the comments made on the subject of security reveal some scepticism about the possibility of full employment. For example:

"There's a regular boom in the industry just now. When it drops is it going to be like 1922-39 again?" "I feel everything will go haywire when the emergency is over. Wives have to put up with never knowing when we will be out of work." "Always through the ages there have been booms and slumps. The present

boom may last some time, but then will be the bad spell." "When we're all out of the army it will be the same as in 1920. No one can ever be secure in building." "It's a political question. There was a slump after the last post-war boom and possibly it will come again."

Some men thought that the nature and present structure of the industry made security impossible:

"There's not much security yet. The battle still goes on between employers and employed." "On the Council I don't feel the foreman will tap me on the shoulder and give me my cards, but at the same time I have a nagging feeling it's not absolutely secure." "I get very worried at times and it gets on my wife's nerves. I would like the building industry nationalized." "There's always that fear of being out." "As soon as this job's finished we'll be paid off." "Nothing is secure in building." "The essential drawback is the stigma of casual labour even now. It's more so with the private builder. There is no security." "There's more security with the Corporation. The private firms offer higher wages but are less secure." "Many men are fed up with Corporation conditions but are held as no other firm can guarantee them more than three months' work." "The Corporation is the only possibility of a regular job. Boys won't take up laborious work and give long training for it to get casual jobs."

The desire for 'the guaranteed week', i.e. for the extension of the guaranteed wage for a period to cover the contract, was widespread, and many men made it clear that they attached more importance to the security offered by this than to higher wages on a more casual basis:

"The 44-hour guaranteed week is more important than the wages." "I would urge for a 44-hour guaranteed week with paid holidays, even two days. Even at Christmas you need to live." "There's no safety till the guaranteed 44-hour week is settled. It's more important than an increase." "Only with the regular guaranteed week will we get security." "If we had a 44-hour guaranteed week the men would be more satisfied and not feel they are being made use of."

The question of paid annual and statutory holidays was often mentioned in connexion with the guaranteed week:

"Christmas holidays, Easter, Boxing Day holidays always mean short weeks and short pay. You get over it and another comes along." "Bank holidays become a menace and no rest."

The attitude of many men was undoubtedly affected by memories of past unemployment and ill-health:

"It doesn't take much imagination to know what it was like. Never knowing whether you would take a full week's wage home, never being able to plan, even wondering whether you should turn out to work in the morning. When you're young and not married you don't mind so much having to travel and live in lodgings. But when you're older you want to settle down and know that you won't have to go looking for work in three months' time." "I don't feel secure. I begin to tire after dinner now." "It will be O.K. now the Bevan Health plan is in. It's a wonderful plan."

The possible effects on employment of new developments in materials and methods of construction were mentioned by only a few. One man, for instance, said that he felt insecure "because of the prefabs and shortages of materials". A handful of craftsmen complained that their art was dying out because of increased mechanization, and one man said, "Bricklaying is becoming a navvy's job". On the whole they seemed to regard modern innovations as temporary expedients only.

(4) *Attitudes to wages*

(a) *Opinions on average weekly wage.* Some of the comments made by the operatives about their wages have already been mentioned. For example, in the replies to the question about the aspects of their jobs that they disliked, the inadequacy or insecurity of the weekly wage was the one most frequently mentioned. The question on security was also

linked to that of wages. The general attitude to the average weekly wage received at the time of interview is shown in Table 10.

Table 10. *Attitudes to average weekly wage*

	"No complaint"		"Can just manage"		"Cannot manage"		No opinion		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Married men	39	13.3	152	51.9	93	31.7	9	3.1	293	100
Single men	33	33.3	38	38.4	25	25.6	3	2.7	99	100
Widowed or divorced	3	37.5	3	37.5	2	25.0	0	0.0	8	100
Total	75	18.75	193	48.25	120	30.0	12	3.0	400	100

Very few (only 7.75%) of the operatives said that they were able to save regularly; 14.5% said that they saved occasionally; but the great majority (76.25%) were never able to save, and 1.5% offered no opinion. The married men, as would be expected, found it more difficult to manage than did the single, many of whom made remarks such as, "It's all right for me because I'm single, but I don't know how I'd make do if I got married." A few young labourers said they would like to marry but did not feel they could afford it, and one or two young married men said that they could not afford to have children. Some of the men in the "no complaint" category had wives who went out to work, but the details obtained about the total family incomes are not complete enough to analyse.

By far the most frequent complaint about wages was that they did not meet the increased cost of living. Only one man out of the 400 on the traditional sites mentioned the shortage of consumer goods.¹ The others complained not of shortages but of high prices. For example:

"I get £4. 17s. a week and give the wife £4. 5s. That leaves 12s. for myself. I was better off before the war on £3. 15s. because the cost of living is so high." "If the cost of living comes down or wages go up to meet it it would be happier." "The wages are all right. It's the cost of living that is too high."

Many men said that it was difficult to pay their way, and that they could not afford even simple luxuries or pleasures:

"It all goes on living. There's nothing left for clothes." "It all goes on getting enough to eat." "I get about £5. 5s. after stoppages. It should be £6. The wife wants at least £4. 10s. for the house and the children. That doesn't leave much for cigarettes and a glass of beer." "It's time the working man had a little life of his own and could buy some things without having the burden of hire purchase." "It's bare existence, with no luxuries." "Very often I have to give the wife everything I earn and have nothing for myself." "It gets to the point when if you have a pint of beer at the end of the week you must give up smoking."

The anxiety and strain of having to meet expenses out of a fluctuating wage and the difficulty of "knowing where you are" were often mentioned:

"The wages are all right in summer. You never know in winter." "I want a guaranteed week because of income tax. You never know where you are." "There's no hope of getting a home together. We live from week to week." "We do not get sufficient, and it's uncertain. I'm always in debt." "It's always a strain and I think that's the whole trouble with everybody."

¹ The only form of consumer goods (using the phrase in its broadest sense) which seems likely to provide a strong incentive is houses. Several men said that a 'bonus' in the form of priority for a house would be a strong inducement to work.

Discontent at low wages was in many cases intensified by comparisons with the higher wages earned by different types of workers:

"It's too big a difference between labourers' and tradesmen's rates of pay. Labourers have the same commitments and they do heavier and dirtier work." "We should have higher wages, and not so much in the governor's pocket." "The need for houses is as great as it was for munitions, and I had twice the pay for munitions." "Wages are very shabby compared with engineers, whose wages have been raised out of all proportion. They can pay for destructive work but not for constructive." "It's a narking point that the government will spend 16 million a day on aeroplanes and not for houses. They won't give the men the same conditions as munitions workers. We've had a raw deal all through. Another narking point is that the men making prefab houses are the ones who made high wages in factories during the war—not that I would go into a factory whatever the wages." "My daughter as a secretary is earning more than I am. I gave up smoking and drinking beer to send her to Pitman's." "When I was in the Army my wife got £4. 10s. Now she has me to feed and I need a few shillings, and we only get £4. 9s. It causes hard feeling."

Many ex-Service men said they were drawing on their gratuities, others said that they had to supplement their wages by doing odd jobs at weekends, and others said that they did not like being forced to allow their wives to go out to work. Vivid epithets were often given to the wage packet; probably many men would think that a Scottish labourer was guilty of understatement when he said, "Well, the wages are a bit wee, you know", although they might not go so far as an operative who said he would not advise his son to enter the industry because "You don't get paid hardly at all."

(b) *Opinions on payment by results.* The opinions of the operatives about their average weekly wage leave no doubt as to their desire to earn more money. In order to study the financial incentive in relation to the operatives' scale of values, questions were asked about the men's previous experience of payment by results and about their opinions on this system. As might be expected from the type of sites visited, almost all the operatives on the traditional sites were being paid by hourly rates at the time of interview, only six men, bricklayers, being paid by results. About one-third of the men had at some previous time been paid by results; the opinions of this group were in all respects very similar to those of the men who had had no personal experience of the system. About one-fifth of the men gave no opinions on this subject, often saying that they preferred to reserve judgement as they had no first-hand knowledge. Out of the total number of 400 men, 316 gave reasons for approval or disapproval. The total number of reasons given was 365, but in the following analysis only the main reason given by each man has been considered, and when a man gave several reasons the secondary reasons have been ignored. This method has been adopted as it was thought that percentages based on the numbers of men, rather than on the numbers of reasons, would be more useful and more revealing. Almost all the secondary reasons came from men whose general attitude was unfavourable. Of the total number of comments made, 18.6% were on the whole favourable, 4.7% were conditionally approving, and 76.7% were definitely unfavourable.

In Table 11, two alternative classifications of the men are given. In Table 11 (a) the men are divided according to their types of work, while in Table 11 (b) the tradesmen's labourers are classed together with their appropriate tradesmen. Whichever classification be adopted the homogeneity of the resulting table is striking. A list of the reasons included under the three main headings of "On the whole favourable", "Conditionally approving" and "On the whole unfavourable" is given in Table 12, so that those who may disagree with the investigator's interpretation of particular remarks may have the data on which to base their own judgements.

Table 11. *Attitudes towards payment by results*

	No. of men in group	Percentage of men who were			Without opinion
		On the whole favourable	Conditionally approving	On the whole unfavourable	
(a) According to types of workers					
Bricklayers	124	16.9	4.8	62.9	15.3
Joiners	70	11.4	4.3	67.1	17.1
Other trades	68	14.7	2.9	60.3	22.1
Total tradesmen	262	14.9	4.2	63.4	17.5
Bricklayers' labourers	33	12.1	6.1	48.5	33.3
Joiners' labourers	7*	14.3*	14.3*	57.1*	14.3*
Other trades' labourers	23	8.7	4.3	52.1	34.8
General labourers	75	18.7	2.7	54.6	24.0
Total labourers	138	15.2	4.4	52.9	27.5
Total men	400	15.0	4.25	59.75	21.0
(b) With tradesmen's labourers grouped with appropriate tradesmen					
Bricklayers and their labourers	157	15.9	5.1	59.9	19.1
Joiners and their labourers	77	11.7	5.2	66.2	16.9
Other trades and their labourers	91	13.2	3.3	58.2	25.3
General labourers	75	18.7	2.7	54.6	24.0
Total men	400	15.0	4.25	59.75	21.0

* The small number of men in this group makes the percentages unreliable.

Table 12. *Reasons given for approval or disapproval of payment by results*

Reasons	% of total no. of operatives
(a) On the whole favourable:	
(1) Gives you a chance to earn more	12.5
(2) Would improve production	2.5
	15.0
(b) Conditionally approving:	
(1) Good if there were strict rules or Government control	2.25
(2) Should be all right with good set of men or as group bonus	1.75
(3) System all right but not properly organized	0.25
	4.25
(c) On the whole unfavourable:	
(1) Regular wage preferred: want more pay but not by payment by results system	22.75
(2) Would lead to bad workmanship	14.25
(3) Would lead to slave driving: open to abuse by employer	7.5
(4) Would lead to division among men	4.5
(5) Impracticable: too many snags and unavoidable interruptions in work	3.5
(6) Would be unfair on the older and less strong workers	3.0
(7) Against Trade Union principles	1.5
(8) Satisfied with present system: know no other	1.25
(9) Too many disputes about calculation	0.75
(10) Did not earn much when paid by results	0.5
(11) Bad. (No reason given)	0.25
	59.75
(d) No opinion	21.0

Some of the actual comments of the men were as follows:

(i) *Generally approving*: "It would be good for me. I'm quick and only take five days on a job that would take most men two weeks." "Good. It gives you a reason to work. I don't like working when others are slacking." "It should be employed while the cost of living is so high." "We'll never get production till we have payment by results."

(ii) *Conditionally approving*: "Bricklayers are very dissatisfied and some incentive such as payment by results would buck them up. But it must be Government controlled." "It's a good idea, but it must be Government controlled so that firms can't alter the amount of bonus." "The system is O.K. if it is worked right, but where I was it wasn't." "It is good for monotonous work, but is inclined to cause skimping." "It's good to earn more, but you'd have to cover up bad work."

(iii) *On the whole unfavourable*: "I prefer to know what I'm getting every week." "If bricklayers had a stable wage they would work of their own accord." "It is best with an hourly set rate. Piece work is slavery." "You can knock a screw in with a hammer quicker than put it in with a screw driver." "It scamps work and sets employees against each other." "It is bad for the workmen, the job and the community. It brings in bad feeling and shoddy work." "Some bosses wangle it." "It boils down to sweated labour." "Payment by results causes dissension." "There would be too much division among the men. Some would work and some would not." "You run up against snags which cut you down." "It's unfair on the older men. And we shall all be old one day."

This analysis of the opinions given by the operatives indicates that to appeal to the strong desire for more money by a system of payment by results would set up many conflicts. The opinions expressed throw much light on the operatives' scale of values and hence on potential incentives to work; it is noteworthy that the difference between the proportions of tradesmen and of labourers who approved of payment by results is negligible. Payment by results would, in the operative's opinion, threaten him, firstly, as an individual: the system would conflict with his desire for a secure, fixed wage on which to base his family budget, and also with his desire to maintain his pride in himself as a craftsman. Some of the men themselves speculated on the nature and possible outcome of such psychological conflicts. For example, a joiner said, "I badly want more money, but not by payment by results. Money's got too strong a pull. I'm afraid it would make me do bad work, and then I should lose my self-respect. So I daren't risk it." Next in importance to the values attached by the operative to himself as an individual wage-earner and craftsman come those associated with himself as a member of an industrial group. He feels that the strength and solidarity of his group would be endangered. If the men became divided against themselves they would lose the good comradeship that many of them so much appreciated, and they would also weaken their position against the employers. The opposing group of employers, on the other hand, would have the added advantage of new opportunities for 'slave driving' and for 'wangling'. The arguments used by the operatives against payment by results do not, of course, necessarily imply that they would fail to respond to its inducements were it instituted. They do, however, make it clear that the question of the advisability of introducing this system is complicated and that this incentive to activity might be to some extent counteracted by opposing tendencies that would also be stimulated.

(5) *Home conditions and some other personal factors*

(a) *Living arrangements*. Of the 462 men interviewed on all sites, 333 were married, 120 were single and nine widowed or divorced. The questions put to the men about their home conditions were intended to bring out any important information on their general living conditions, and to throw some light on their interests and spare-time occupations. 356 of the men were living at home, thirteen in a hostel, forty-six in lodgings and forty-four with relatives.

Forty-eight men, many of them on a Scottish site, complained that their main difficulty was unsuitable housing conditions, while forty-two said that their chief concern was to get a house of their own. Twenty-two had problems connected with overcrowding or with the sharing of accommodation, and eleven men complained that the hostel in which they were living was uncomfortable. There was thus a total of 123 complaints connected with accommodation made by 117 men. This fact lent point to the remark, often made during interviews, that it was discouraging to be working on a housing project with no prospect of acquiring a much-needed house one's self. Of other worries connected with personal

situations the most frequent was illness at home. Many men who complained about their living conditions also had other problems; some had marital difficulties, some were worried about their children's future and some counted transport as a "home difficulty". (It has already been mentioned that information about children and dependents was not sufficiently precise to be used in this report.)

(b) *Travelling time.* The following table shows what proportion of the operative's day was spent in travelling to and from work, the average being 30.15 minutes for a single journey.

Table 13. *Time spent in travelling to work (single journey) by 400 operatives*

Time in minutes	% of men	Time in minutes	% of men
1-10	20.25	61-70	0.0
11-20	18.0	71-80	2.5
21-30	21.0	81-90	3.25
31-40	3.5	150	0.25
41-50	15.5	No information	1.25
51-60	14.5		

It will be seen that 36% of the men spent half an hour or longer in getting to work and that 6% spent well over 1 hour. On some sites travelling was a question of great importance, and much unrest was caused by problems such as travelling allowances, inadequate transport services and by the quartering of men who felt that unpunctuality was often due to no fault of their own. The remarks made by some of the men suggest that if an agreed minimum of travelling time were reckoned as working time, they would be less reluctant to work at a distance from their homes.

(c) *Spare-time occupations.* A question about their spare-time occupations was answered by 276 men, out of 462, with 347 answers among them. By far the greatest majority of these answers indicated creative and active spare-time occupations. Gambling, watching sporting events, visits to the cinema, listening to the radio and similar comparatively passive recreations together account for only thirty-three of all the answers. Gardening, and crafts, usually woodwork, engaged the leisure time of 170 men; active outdoor sport came next with fifty-nine. The list given in Table 14 shows the other activities in which the men said they were occupied. 186 men either had no spare-time interest, or mentioned

Table 14. *Spare-time occupations of 462 men*

Occupations	No. of men
None, or no information	186
Gardening	97
Crafts (woodwork, etc.)	73
Active outdoor sport (football, etc.)	59
Cycling, shooting, fishing, boating, walking	24
Dancing, cinema, radio	18
Arts (music, painting, etc.)	17
Reading, studying	16
Breeding animals or birds	15
Watching football or other sport	11
Clubs (dramatic, political, etc.)	11
Gambling	4
Stamp collecting	2

none, though some referred to time spent at home amusing their children or helping their wives. Forty-four men did paid jobs, either regularly or occasionally, in the evenings or at weekends. The wide variety of interests mentioned, here of necessity collected under a few main headings, seems to indicate that the operatives are an alert, individualistic and healthy group of men. The information obtained is doubtless incomplete and this question

was not discussed at any length during the interviews. For example, the numbers of men accustomed to watch football is probably larger than the figures suggest, but it remains significant that the figures indicate the occupations uppermost in the men's minds and possibly those to which they themselves attached the greatest importance.

(d) *Opinions on their sons entering the industry.* One of the questions that elicited answers very revealing of the men's general attitude to work and conditions was not direct and personal. It was the question about what their attitude would be towards their own sons entering the industry. This question was asked for two reasons: the first of these was to obtain some information as to the strength of family tradition and as to whether future apprentices were likely to be sons of present operatives; the second, and main, reason was the supposition that there would be some matters about which the operatives would talk more freely if they were asked to consider these as affecting a person important to them, but not themselves. As the answers to this question show, this supposition proved correct.

In Table 15 the answers given are analysed. Of the 400 men who were asked this question, 381 replied and nineteen (many of whom were young apprentices) gave no opinion. Just under half the men who expressed an opinion were opposed to their sons entering the industry, and some of the men who are placed here as giving a conditional approval were clearly doubtful as to whether their conditions would be met. There were 119 men who said that they themselves had entered the industry because of a family tradition (see Table 16) and a comparison of this group with the remainder shows that it

Table 15. *The operatives' opinions on their sons entering the industry*

Comments	Percentage of total no. of operatives (400)	Percentage of 381 men expressing an opinion
A. Definite approval	16.75	17.6
B. Conditional approval:		
(i) In a higher grade than self	13.0	33.6
(ii) Let him choose	9.0	
(iii) Son already in industry	5.0	
(iv) If it becomes secure	4.0	
(v) On indoor job	1.0	
C. Definite disapproval, with no reason given	3.25	
D. Definite disapproval, with reason given:		
(i) Too insecure*	13.0	48.8
(ii) Bad social status: better job wanted	11.25	
(iii) Too rough: bad conditions	7.25	
(iv) Forces or emigration preferred	3.5	
(v) Industry's future too uncertain	3.0	
(vi) Other industry preferred	2.75	
(vii) Wages too bad	2.5	
E. No opinion given	4.75	

* Seven men in this group gave supplementary reasons, not included in this table.

Table 16. *Opinions on sons entering the industry of operatives with and without a family tradition in building**

	Approval		Conditional approval		Disapproval		Total	
	No.	%	No.	%	No.	%	No.	%
Men with family tradition	23	19.5	30	25.4	65	55.1	118	100.0
Men without family tradition	44	16.7	98	37.3	121	46.0	263	100.0
Total	67	17.6	128	33.6	186	48.8	381	100.0

* This table does not include the nineteen men who expressed no opinion; eighteen of these were men "with out a family tradition".

contains a higher proportion of men opposed to their sons following in their footsteps. Although the difference is not large, it indicates that young recruits to the industry may to-day be found less often in the families of building operatives than elsewhere and that those who are themselves following a tradition are less certain of the future than those who are not.

In many respects the replies to this question confirm the replies previously given to other questions. For example, the largest sub-group of those who gave conditional approval said that they wanted their sons to have more skilled, or higher graded, jobs than their own. This gives added weight to the importance attached to desire for progress or promotion in the answers to the question about ambitions. Again, the stress laid on security underlines similar comments made in reference to a direct question on security as well as many comments made in discussing clothing, payment by results, the weekly wage, and reasons for disliking the job. However, in one important matter, namely the social status of the building operative, the question crystallized a pervading feeling. In many cases, the men in discussing other topics referred vehemently and sometimes irrelevantly to their resentment at the allegedly low social status accorded to them. When it came to considering their sons' prospects, the objections to the industry on this ground were more numerous and more precise, and it was obvious that they were projecting their own sentiments and were to a great extent freed from the inhibitions which prevented them from a more direct and personal expression. In the minds of many men the casual labour usually inevitable in the industry is in itself a mark of social inferiority and is felt to be degrading and a 'stigma'. For example, one bricklayer who had been 11 years in the industry, when asked what he disliked about his job, said that the essential drawback was "the stigma of casual labour, even now"; later, when questioned as to his attitude to his son entering the industry he replied that he would not allow him to do so because of its insecurity and social inferiority. The same man complained of the lack of washing facilities because "the men try to get clean in the afternoon" and he added, "We all bring a brush to work for our boots and clothes. It makes you feel bad to sit in a bus in dirty clothes and have the person next to you give you a look and then move to another seat. The average person's idea of a building operative is a man in corduroys with a scarf round his neck. Why *should* it have to be that way?" This man, who was not unusual, regarded a guaranteed week as of greater importance than higher wage rates.

Some of the comments made are as follows:

(i) *Definite approval*: "Yes. It's a fine life despite disadvantages." "Yes. In my trade it's as good as any." "Yes. I would like him to have a good training."

(ii) *Conditional approval*: "Yes. But in building they must have a trade." "Yes, but only if it becomes secure." "It's a good life if he wants it." "Yes, but not as a labourer. Perhaps as a tradesman—the tradesmen always rule." "Yes, inside a joiners' shop."

(iii) *Definite disapproval, without reason given*: "No. Only as a last resort."

(iv) *Definite disapproval, with reason given*: "In fifteen to twenty years many craftsmen will be obsolete because of new methods." "I wouldn't have him go in. There will be a slump after a few years." "No. Things are not bad now but they could easily go back." "No. A collar and tie job for him." "The man who takes off his jacket is a fool." "No. Any boy that dons overalls is a fool." "No. I want them to be educated and healthy. I had rheumatism too young." "I want my son to have a better education and go to college." "The trade is too casual. He's got a horror of the tools because he knows what his Dad's life has been." "I wouldn't like them messed around as I have been." "I shall try to prevent them. It's too hard work." "No. Put him in the Navy." "I wouldn't let him. Grandfather and me had too hard a time." "My sons are all in building. It's the biggest mistake I ever made to let them." "No. It's not worth while a youngster spending so many years to get wet time."

(e) *Health.* The great majority of the men (85.25%) said that they considered their present health to be good, 12.75% saying that their health was fair and only 2% saying that it was definitely poor. When asked about their past health record only 24.75% said that they had suffered from anything more serious than common minor ailments. The illnesses mentioned by this 24.75% are shown in Table 17 (twenty-three of the ninety-nine men in this category mentioned more than one illness). Many men attributed their good health to their outdoor and active life and some of those who had had experience of factory work during the war compared this unfavourably with their present occupation. Only fifty men (12.5%) said that they thought their health was adversely affected by their work, and most of these men referred to gastritis which they attributed to eating sandwiches.

Table 17. *Past illnesses mentioned by the operatives*

	% of men		% of men
Gastric disorders	6.0	Malaria	2.5
Influenza, colds, etc.	5.5	War wounds	2.0
Pleurisy, lung diseases	5.25	Operations	1.25
Rheumatism	3.75	Cardiac diseases	0.25
Accidents	3.75	Eye troubles	0.25

Complaints of fatigue after work were rare. Only 5.5% of the men said that they felt excessively tired and 23.5% said they were moderately or occasionally tired. On some sites where there was no canteen a number of men said that they felt listless during the afternoons but in their opinion this was due to hunger and not to fatigue or boredom. The type of fatigue suffered was usually general fatigue, localized muscular fatigue being mentioned far less frequently.

'Nervousness' in connexion with work was seldom reported. 4.75% of the men said that they were occasionally or moderately 'nervous' and 1.25% said they were acutely so. In the majority of cases nervousness was related to a specific cause and did not seem to be temperamental in origin. For example, on one site a number of men said they were nervous of the out-of-date scaffolding, which they considered dangerous; other men were nervous of making mistakes in their work, owing to lack of skill or experience, while others were apprehensive of losing their jobs through physical defects such as failing eyesight. Seven men said that they were nervous of heights, but five of these had had accidents through falling or were suffering from some disability, such as occasional giddiness after a head injury. Three men said that they had recently felt 'jumpy' and lacking in energy and attributed this to lack of proper food, while three others had symptoms that seemed psychoneurotic in origin. The assessment of temperament did not form part of the purpose of this inquiry, but such evidence as was obtained indicates that as a group the operatives were relatively free from psychoneurotic symptoms.

III. DISCUSSION OF RESULTS

These results form a strikingly clear picture of the men's general attitude to work. The main lines of its pattern are formed by their marked and predominating interests, in relation to which they tended to judge each aspect of their environment. The power of an individual's main interests to colour his whole outlook is well recognized. The point to which attention is drawn here is the degree of agreement among the group of men interviewed as to the nature and relative importance of their main interests. This agreement is

given added significance when one remembers the composition of the group, which consisted of men working in a wide variety of conditions, on sites in different parts of England and Scotland, and which included workers of all types. The impression left on the investigator by these men was that they were of strong individuality with marked and very varied personal characteristics and with appreciation or tolerance of those who differed in temperament or age from themselves. There was certainly no evidence of high suggestibility or of pressure by the group to force its members to comply with an accepted norm. The reasons for the underlying homogeneity and for the accompanying individual differences are possibly to be found in the long history of the industry and in the constant shifting of its population from one working group to another. It is the homogeneity and not the diversity that is the main concern here.

The question of incentives to work, which is to-day of importance to all persons in the industry, is perhaps most profitably considered in its relation to the main values and needs of the operatives. The incentives that are likely to have the most immediate and greatest effect upon production are those that stimulate already powerful driving forces and that influence the specific ends to which they are directed. The study of human motivation is complicated by a number of factors, one of which is that there is no way of determining the strength of an incentive except by observing the corresponding reaction; the reaction, however, results from a drive that may be latent, and hence of unknown intensity, until aroused by the incentive. A further problem is that in interpreting statements about motives, however honestly made, it cannot be assumed that the consciously held motive is the only, or even the most important, force in operation. The difficulty also arises that motives, and hence incentives, are related to the total situation. In any one worker many motives may operate simultaneously and their relative strength will vary according to changes in the social situation and in his physical and mental states. In a modern industrial community the fundamental drives of hunger and sex are interwoven with many secondary motives, and the latter seem to be largely determined by the culture pattern of the industry and society in which the individual works and lives.

No analysis can be attempted here of all the factors that affect the attitudes of both employers and employees to post-war industrial conditions, nor of the more general and deep-seated psychological conflicts of our time. For the building industry the factor of most outstanding importance is possibly that it is faced with a labour situation in which the primary motives to work and earn have lost much of their former strength. Now that the fear of unemployment is less acute the question arises as to how far other motives for working can provide satisfaction for both employer and employee. In pre-war days the fear of unemployment urged a man to try and convince his employer that he was a good and quick worker, although, on the other hand, it also urged him to 'go slow' whenever he could do so unobserved. As one man said, "If you knew that you were going to be out of work when the contract was finished, it was only human nature to spin it out as long as you could." The results of this investigation show that even in 1946 there was by no means a universal feeling of security of employment and that uneasy scepticism about the future made the assurance of greater security and a guaranteed week seem a matter of urgent importance to the operatives. To them there was no comparison between the value of a steady guaranteed wage and the value of higher but less regular wages obtained either through a rise in rates or through payment by results. Their pre-occupation with the question of economic security was clear. It may be remembered that the most frequent

reason given for not wishing their sons to go into the industry was its lack of security; the main argument against payment by results was the preference for a steady wage; and the low social status so much resented by the building operative was thought to be due to his being 'casual labour'. If the building operative were to achieve his desire for security of employment there is no reason to suppose that he would work harder as a result. The importance of security lies rather in the fact that the attitude of the men was such that unless they first obtained the greater measure of security that they desired, and demanded, they seemed unlikely to respond fully to any incentives to higher productivity.

It might be thought that the strong and widespread desire for more money would make a system of payment by results acceptable to the operatives. According to the results of this investigation, however, this was not the case; the men were not prepared to use such means to obtain their ends. The men who argued that payment by results would be impracticable, even if not theoretically undesirable, may in some cases have been rationalizing their more fundamental objections, although their view is supported by many experts from both sides of the industry. The main arguments against the system, however, were based on psychological rather than on practical grounds—on the fear that this incentive would inhibit or destroy other strong and pleasurable motives for working. The most clearly formulated of these other motives was that of working for its own sake.

One of the most widespread and strongly marked characteristics of the operatives, particularly the tradesmen, was pride in workmanship. This appreciation of quality rather than of quantity must to some extent act as a brake on high productivity and there is much evidence from this investigation that any attempt to increase output at the expense of lowering standards of quality aroused strong feeling and opposition. The most frequently mentioned ambition of both tradesmen and labourers was to obtain promotion or to become more skilled and it seems possible that an incentive designed to stimulate this ambition might stir men to greater activity and at the same time give them the satisfaction of recognizing the value they attach to quality. Any real or imagined threat to pride in workmanship would probably set up a mental conflict which might ultimately inhibit rather than stimulate willingness to work. If, however, this pride could itself be fostered by some form of reward or recognition, it might liberate much latent energy; from a psychological point of view there is much to commend the setting up of more ladders of progress than at present exist. Other researches have shown that targets or standards of achievement exert considerable influence on a worker's efficiency, and also that self-imposed standards and standards set by individual supervisors vary considerably and are in most respects less satisfactory than standards set by an external and recognized authority.

Another aspect of working to which the operatives attached great importance, and which they felt to be menaced by payment by results, was that of the social solidarity of the group. The marked good-fellowship among the operatives on all sites visited was undoubtedly a positive source of satisfaction. This feeling seemed to some extent to be due to the sense of tradition, to the awareness both of the past and of the future. Young men and old men were mutually tolerant of each other's weaknesses, anticipating or remembering their own, and felt more strongly linked by their similarities than divided by their differences. To some extent this group loyalty was a defence against the 'other side', the employers, but its mainspring seemed to be spontaneous sociability. The unity of the gang is perhaps of special importance on a large site, and on one such site there was

resentment at the way in which men were transferred, for no obvious reason, from one gang to another. A group constituted so that the members are roughly of the same level of ability, as well as being congenial in temperament, provides an incentive to each man to work to his capacity. If a system of payment by results were based on group and not on individual work, some of the objections to it on the grounds of its causing disunity among the operatives would be removed. However, as many of the men themselves realized, social incentives to work came not only from the working group itself but also from the relationships between that group and those in authority.

The respect and liking of about half the operatives interviewed for their foremen has been noted. Only a few cases were reported of foremen who were definitely unpopular, sometimes because they did not know their job and set too low standards of craftsmanship, sometimes because of their attitude to the men. The results of this investigation support those obtained elsewhere of the greater efficacy of encouragement than of blame as a spur to activity. There were considerable differences between the sites in foreman-operative relationships, which suggests that the standards of foremanship are far from uniform. Some of the foremen themselves made remarks that revealed their inability or unwillingness to adapt to modern conditions, in which authority has to be based on grounds other than the power to sack. The opinions of a foreman about his men were often very similar to their opinions about him.

On most of the sites the relationship of the operatives to the management was characterized by lack of contact and ignorance. The remarks of both managers and operatives indicated that good feeling and trust between the two groups bore a direct relation to the amount of personal contact between them. One of the chief differences between the direct labour sites and the sites of private contractors lay in the personal relationships between the operatives and the supervisors of various levels. On the direct labour sites the management were much less popular than they were on the private contractors' sites. On the former 21.4% of the men expressed definite disapproval of the management, as compared with 8.8% on the private contractors' sites: 10.4% of direct labour employees expressed definite approval, as compared with 29.9% of private contractors' employees. It is possible that one of the factors that led to the comparatively high number of criticisms of the management on the direct labour sites, and to the generally lower morale of the men, was the size of the organization of which the site formed a part. On one of these sites (site H) the size of the site itself created psychological problems. It is noteworthy that the largest of the private contractors' sites (site E, employing 325 men) had also a high percentage of discontented men. It is not easy to weld a large organization or a large working group into a socially integrated unit and one of the advantages of any small organization is that contact between different levels is personal and direct. In the large organizations, the apparently inadequate or circuitous lines of communication laid down meant that those framing policy were necessarily out of touch with the needs and wishes of those in the lower grades. The latter, in their turn, felt that it was difficult if not impossible for them to express their opinions and obtain redress of their complaints. As a result, grievances became magnified out of all proportion to their original cause and the operatives came to believe that those in authority neither knew nor cared about their existence. In other industries it has been found that active participation in the planning and administration of a working unit leads men to develop a sense of personal responsibility and pride in its achievements and provides a strong incentive to doing good work.

One advantage of providing a means whereby each group may become better informed about the other is that the possession of information may in itself evoke interest and act as an incentive to work. A target for production, as has already been said, arouses interest and spurs men on to attain it even when no extra reward is entailed. It can also sometimes be used to encourage friendly competition between different gangs.

In connexion with the question of production targets, some mention must be made of Press and other publicity. Several occasions were noted on which men expressed their resentment at adverse publicity and at charges of slackness and lack of public spirit. There was some criticism of the government attitude to building operatives, expressed in comments such as, "All they care about is the houses. They don't care about the men who build them" and "If this were a military operation things would be very different. They thought we were worth looking after when we were in the Forces." The description of the operative as "the Cinderella" of industrial workers was frequently heard and the psychological implications of this need no elaboration.

It is possible that many of the opinions analysed in this report have little or no rational justification. It was no part of this investigation to find out whether or not this were so. However, the validity or otherwise of beliefs is relevant only to a study of their nature, not to a study of their effects upon action. Irrational prejudices and opinions are often more powerful and more persistent than more logical and more unemotional views. This investigation draws attention to the importance of the social psychology of the building industry, which differs from many other great industries such as engineering, in that it has been less affected by mechanization, and the resulting boredom, and also less affected by the associated desire for money as a symbol of individual worth. The building operative, despite his hard times, has maintained his self-respect as an individual and as a workman, and, in the investigator's opinion, he is likely to respond favourably to incentives that appeal to his own scale of values and not to those that are superimposed and transplanted from industries very different from his own.

APPENDIX

Number of men interviewed at each traditional site according to trades

Site	...	...	...	Private contractors' sites										Direct labour sites					Total all traditional sites			
				D	E	F	G	J	K	M	P	Q	R	B	Total	B	C	O		H	Total	
No. of men on site	...	...	...	83	325	57	22	22	19	108	47	58	18	12	771	12	79	47	187	1211	1524	2295
No. interviewed	...	...	...	23	61	19	19	22	12	26	12	18	10	5	227	5	19	35	100	173	400	
Bricklayers				7	18	4	5	8	5	9	6	4	3	—	69	4	6	12	33	55	124	
Joiners				1	14	3	3	4	3	7	—	4	4	—	43	3	3	6	15	27	70	
Painters				1	3	2	—	—	—	1	—	1	—	—	8	2	2	—	1	5	13	
Plumbers				2	—	—	1	—	—	—	—	—	—	—	3	2	1	2	5	10	13	
Plasterers				1	—	2	2	—	1	2	—	1	—	2	11	—	—	4	6	10	21	
Tilers and slaters				—	—	—	2	—	—	—	—	1	—	2	2	1	—	1	1	3	5	
Electricians				2	2	1	—	—	—	—	—	—	—	—	8	—	—	—	6	6	14	
Other trades				—	1	—	—	—	—	—	—	1	—	—	2	—	—	—	—	—	2	
Total tradesmen				14	38	12	13	12	9	19	6	12	7	4	146	4	12	25	67	116	262	
Tradesmen's labourers*				1	15	4	3	4	—	—	3	1	—	1	32	5	3	7	16	31	63	
General labourers				8	8	3	3	6	3	7	3	5	3	—	49	2	4	3	17	26	75	
Total labourers				9	23	7	6	10	3	7	6	6	3	1	81	7	7	10	33	57	138	

* This category includes semi-skilled labourers, such as scaffolders, etc.

Number of men interviewed on each non-traditional site according to trades

Site	...	A	N	S	Total
No. of men on site	...	40	102	204	346
No. interviewed	...	18	25	19	62
Bricklayers		3	4	9	16
Joiners		3	5	1	9
Painters		—	2	—	2
Plumbers		—	3	1	4
Plasterers		1	2	—	3
Tilers and slaters		—	1	—	1
Electricians		—	1	—	1
Other trades		—	—	—	—
Total tradesmen		7	18	11	36
Tradesmen's labourers*		3	—	1	4
General labourers		8	7	7	22
Total labourers		11	7	8	26

* This category includes semi-skilled labourers, such as scaffolders, etc.

Men interviewed on all sites according to trades

Site	...	Traditional	Non-traditional	Total
No. of men on site	...	2295	346	2641
No. interviewed	...	400	62	462
Bricklayers		69 + 55	16	140
Joiners		43 + 27	9	79
Painters		8 + 5	2	15
Plumbers		3 + 10	4	17
Plasterers		11 + 10	3	24
Tilers and slaters		2 + 3	1	6
Electricians		8 + 6	1	15
Other trades		2 + —	—	2
Total tradesmen		146 + 116	36	298
Tradesmen's labourers*		32 + 31	4	67
General labourers		49 + 26	22	97
Total labourers		81 + 57	26	164

* This category includes semi-skilled labourers, such as scaffolders, etc.

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'AESTHETIC' AND 'TECHNICAL' FACTORS IN ARTISTIC APPRECIATION¹

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I. INTRODUCTION

Two simple experiments were carried out to test the hypothesis that the essential tendencies, impulses or emotions expressed in art are integrations of other than uniquely aesthetic tendencies, while the essential material of art is the harmonious integration of objects, forms, colours, sounds or other qualities into designs which express those emotions and tendencies (1).

In a statistical research on the appreciation of pictorial and other material, Eysenck (2) showed that there were two factors in aesthetic judgements: first, a general factor, which he calls '*T*', or the factor of good taste; and secondly, a bipolar factor, which he called '*K*' and which he identified at first with responses to colourfulness, but which also tended to contrast formal with representational art. In a later paper, Eysenck (3) showed that the bipolar factor was closely related to differences of personality-type, the objective and extraverted personalities tending to prefer modern and colourful works of art, while the introverted personalities tended to prefer formal, subdued and older styles of painting. In another statistical research on the psychology of art, Peel (4) showed in an experiment with landscapes that two factors could be identified again: the first or general factor corresponded to the subjects' responses to aesthetic composition, and the second or bipolar factor expressed their responses to "detailed naturalism". In view of other studies of the psychology of art it seemed that the problems of emotional expression had been neglected by Peel and Eysenck, and in the present experiments an attempt was made to meet this difficulty as well as to test the hypothesis stated in the opening paragraph of this paper, which was put forward on general grounds by Pickford in 1940 (1).

II. AN EXPERIMENT WITH PICTURES

For the first experiment a set of eighteen pictures was collected. They were all good, coloured reproductions, as large in size as could be obtained. They were numbered in the bottom right-hand corners, in random order, from (1) to (18), and care was taken to cover the titles and artists' names with small slips of paper. The pictures were chosen from a larger selection, in such a way as to represent as great a variety of different styles, periods of art and degrees of aesthetic merit as possible within the limitations imposed by the difficulty of getting good reproductions at the present time. Certain works which would have been very useful for the experiment, such as Rossetti's '*The Beloved*', were not included because they could be obtained only in black and white or in postcard size,

¹ Based on a paper read to the British Psychological Society at Durham, April 1946.

while others, such as Guthrie's 'Highland Funeral', which could be obtained in a large coloured reproduction, were set aside as being too familiar for a group of Scottish students.

The pictures chosen were as follows:

- (1) Hornel, 'Spring Roundelay'.
- (2) Goya, 'The Firing Party'.
- (3) 'Regimental Red'—an almost completely inartistic advertisement for lipstick; a photograph.
- (4) Morland, 'Blind Man's Buff'.
- (5) Renoir, 'Women in a Field'.
- (6) Vivien Leigh and Laurence Olivier as Scarlett O'Hara and Maxim de Winter—a coloured photograph with some artistic merit.
- (7) Picasso, 'The Dream'.
- (8) Gauld, 'Contentment'.
- (9) Bosch, 'The Holy Night'.
- (10) Manet, 'Peaches'.
- (11) 'The Victorian Pair'—a partly photographic advertisement for plaid skirts, the non-photographic parts suggestive of Matisse.
- (12) Kanelba, 'Pamela Mountbatten'.
- (13) Derain, 'Le Samedi'.
- (14) Botticelli, 'Pallas and the Centaur'.
- (15) Dali, 'Lady Mountbatten'.
- (16) Gauguin, 'Le Bouquet'.
- (17) Grünewald, 'St Erasmus and St Mauritius'.
- (18) Rembrandt, 'The Supper at Emmaus'.

It will be seen that in this series there were artistic and inartistic photographs; realistic, impressionistic, modern, classical and surrealist paintings; and that various degrees of emotional expression, harmony of design and other qualities were represented. A list of possible aesthetic qualities was drawn up in order to study the influence they exerted on the appreciation of pictures. Since it was known that the experiment would have to be completed in a single 2 hr. period of experimental psychology, this list was limited to eight qualities. The temptation to increase the number of paintings over 18 and the list of qualities above eight was resisted; larger numbers of paintings and qualities might have given better experimental results, but would have been too many to deal with in the time available.

The list of qualities was as follows:

- (1) Liking or Disliking—Interpreted in the simplest way possible, without special analysis.
- (2) Aesthetic Design—Harmony of form, pattern or colouring.
- (3) Sentimentality—Ineffective, exaggerated, shallow, melodramatic or insincere striving after emotional effect.
- (4) Emotional Expression—Genuine expression of feeling or emotion, whether pleasant or unpleasant.
- (5) Representational Accuracy—Precision, realism or photographic exactness in the rendering of objects and details.
- (6) Symbolic Expression—The Manipulation or distortion of normal objects to express feeling and emotion, as in the lengthening of an arm to express stretching for something desired.

(7) Atmospheric Effect—The Impressionistic use of light and shade, and of subtle tones of colouring, to express objects, moods and feelings.

(8) Religious Feeling—The individual subject's own conception of spiritual quality, whether the painting was intended to be religious in the conventional sense or not.

In a preliminary list of qualities harmony of colouring and rhythm were included, but harmony of colouring was omitted later because it might be assumed to be included in aesthetic design, and rhythm was omitted because it is a conception which presents special difficulties to some people in static art. I am indebted to Miss Ruth Bowyer, Mr P. A. D. Gardner and my wife for help in considering the possible aesthetic qualities and the pictures.

In carrying out the experiment two groups of subjects were used: the University Group included 29 post-graduate and Honours students in the Psychology Department at Glasgow University, many of whom were interested in the psychology of art; the W.E.A. Group included 30 serious students of psychology in Evening Classes at Glasgow University, some of whom were also interested in art. I am indebted to Miss Mary I. Rankin for carrying out the experiment according to instructions upon her W.E.A. class, but most of the W.E.A. students were in my own evening class. There were more women than men in both the University and the W.E.A. Groups.

The pictures were distributed on the tables in the laboratory and the experimenter went round frequently and changed their order to vary any possible contrast effects as much as possible. The subjects were given record forms and were asked to concentrate on one quality at a time, taking the qualities in irregular order, and to rate all the paintings for that quality before turning to another quality, taking the paintings in irregular order; thus in the whole group the only consistency of order was the concentration upon one quality at a time. This was considered important, because the experiment was to deal with correlations between qualities and not with correlations between pictures or individuals. A 7-point scale was used, running from +3 (complete saturation with the quality in question) through zero (indifference) to -3 (absence of or negative saturation with that quality). The subjects were warned not to avoid the extreme ratings. It was explained that some of the qualities might have positive ratings only, and that some of the eight qualities might overlap, so that the presence of one quality might imply the presence or even the absence of one or more of the others. The names of the qualities were written on the blackboard and the qualities were defined as above for the purposes of the experiment. All were readily intelligible except symbolic expression and aesthetic design, which were illustrated by reference to paintings not among the eighteen used in the experiment. The subjects did not find any difficulty in doing the experiment.

III. AN EXPERIMENT WITH MUSIC

In the second experiment the same method was applied to music. With Dr P. E. Vernon's help Miss Dorothy Lawson made a selection of sixteen gramophone records according to the following scheme: Modern, Classical, Romantic and Jazz; in each of these sections it had been intended to include one orchestral piece, one piano, one vocal and one instrumental solo other than piano. Owing to the difficulties of finding suitable gramophone records it was not possible to follow this scheme exactly. The following pieces of music were used:

- (1) Bax, 'Tintagel' (orchestra).
- (2) Bliss, 'Polonaise' (piano).
- (3) Delius, 'Queen of My Heart' (song).
- (4) Elgar, 'Sospiri' (harp and strings).
- (5) Beethoven, *Overture, 'The Ruins of Athens'* (orchestra).
- (6) Bach, *Prelude and Fugue in F sharp major* (piano).
- (7) Brahms, 'Errinerung' (song).
- (8) Tschaikowsky, *Symphony V, Andante* (orchestra).
- (9) Grieg, 'Våren' (orchestra).
- (10) Liszt, 'Au Bord d'une Source' (piano).
- (11) Boughton, *Fairy Song from 'The Immortal Hour'* (song).

- (12) Mendelssohn, *Violin Concerto, Slow Movement* (violin).
- (13) The Hot Club of France, 'Ain't Misbehavin'' (band).
- (14) Tin Pan Alley Selection (two pianos).
- (15) Jean Sablon, 'Avignon' (song).
- (16) Artie Shaw, *Clarinet Concerto* (clarinet and orchestra).

These pieces were played on the gramophone to three groups of University students in Psychology: M.A. Ordinary (two separate classes), and Ed.B. Honours. The men and women were separated in the calculations and totalled 21 men and 37 women. The order of playing of the gramophone records was different for each group, and was determined by drawing numbered slips out of a bag. The students were asked to rate the pieces of music for ten possible aesthetic qualities which were explained to them beforehand. The 7-point scale was used again for rating, and, as with the pictures, it was pointed out that some qualities might have positive ratings only, and that any of the qualities might overlap in certain respects. The students were asked to concentrate on one quality as they made the rating for it but, of course, in this experiment it was impracticable to go through all the records sufficiently often for all the qualities to be separately rated throughout. As in the pictures experiment, a single 2 hr. period was fully occupied for each of the three classes.

The qualities to be studied in the music experiment were chosen by Miss Lawson in consultation with Dr Vernon and myself. The list differed in certain ways from the list of qualities for the pictures experiment. Representational Accuracy, Aesthetic Design and Symbolic Expression were omitted, but Rhythm, Imagery, Brilliance of Tonal Colouring, Tension, Formality versus Impressionism and Intellectual Appeal were added. The four omitted seemed less appropriate to music than to pictures, but Rhythm was more important. Atmospheric Effect was better expressed for music as Formality versus Impressionism. Intellectual Appeal was introduced on Dr Vernon's advice, and because it might be related to Aesthetic Design which was included in the list of qualities for the pictures experiment. Imagery and Brilliance of Tonal Colouring seemed interesting, especially because it was regretted that harmony or brilliance of colouring had not been included in the pictures experiment. Miss Lawson was particularly interested in Tension, by which she meant the tendency for stress to accumulate during a passage of music and to be released, in most cases quickly, after reaching its highest level of intensity. This seemed to be a marked feature of certain pieces, especially the Tchaikowsky. It may appear unfortunate that exactly the same list of qualities was not used in both experiments, but it is an advantage that some identical and some different ones were used, because both experiments were limited to what could be done in a 2 hr. period, and in the two experiments fourteen qualities were studied altogether instead of eight if the second list had been the same as the first. In a further experiment it would be better to use eight or nine qualities which these experiments show to be most interesting, and which can be applied equally well to painting and to music.

IV. TREATMENT OF RESULTS

The ratings for the eight qualities of the pictures experiment were added algebraically for all subjects and all pictures, and inter-correlations were worked out between the qualities by Spearman's rank difference formula. At first separate tables of correlations were made up for the W.E.A. and University Groups, and these were factorized separately by the simple summation method, without rotation. Since there was little difference between the two groups, the factor loadings were averaged for the final table.

In the music experiment a similar procedure was adopted, but here the correlations between qualities were worked out and factorized separately for men and women. The centroid method of factorization was used, without rotation, and again, since men and women differed but little, averaged loadings were given in the final table.

In Table 1 the results of the two experiments are grouped together. It will be seen that one general and one bipolar factor were found in each experiment. No adequate evidence for second bipolar factors was forthcoming. These factor loadings are arranged as far as possible in such a way that the heaviest loadings for the general factors come in the middle of the table, while for the bipolar factors the heaviest loadings come at the

extremes, positive at the top and negative at the bottom. The order given in the table does not fully satisfy these conditions, but is the best possible for all fourteen qualities taken together. Four qualities are common to both experiments: Liking, Sentimentality, Emotional Expression and Religious Feeling. Of these, Emotional Expression is definitely central for both experiments, Liking and Religious Feeling would be more central for the music than for the pictures and Sentimentality would be less central. If Aesthetic Design in pictures corresponds to Formality in Music, then it is understandable that these qualities are similarly placed in the two experiments.

Table 1. *Factor loadings for qualities in aesthetic appreciation*¹

Quality rated	Pictures experiment		Music experiment	
	Factor I	Factor II	Factor I	Factor II
Rhythm	—	—	0.269	+0.422
Liking	0.282	+0.470	0.904	+0.191
Representational Accuracy	0.386	+0.685	—	—
Sentimentality	0.647	+0.490	0.374	+0.514
Aesthetic Design	0.684	+0.068	—	—
Formality <i>v.</i> Impressionism	—	—	0.801	+0.316
Emotional Expression	0.705	-0.268	0.851	+0.282
Religious Feeling	0.528	-0.336	0.900	+0.172
Intellectual Appeal	—	—	0.803	-0.357
Atmospheric Effect	0.544	-0.459	—	—
Imagery	—	—	0.681	-0.333
Tension	—	—	0.741	-0.549
Brilliance of Colouring	—	—	0.370	-0.658
Symbolic Expression	0.086	-0.650	—	—

V. INTERPRETATION OF THE FACTORS

An interpretation of the general factor for both music and pictures would suggest that its principal qualities are Emotional Expression and Aesthetic Design (alternatives for Aesthetic Design in music being Intellectual Appeal and Formality). These qualities are combined in it inseparably and vary together. It may be called the Aesthetic Factor. It seems to be essentially the same as Eysenck's and Peel's general factors. Its weak qualities are Rhythm and Sentimentality on the one hand, and Atmospheric Effect, Imagery, Tension, Brilliance of Tonal Colouring and Symbolic Expression on the other. These qualities, however, are strong in the bipolar factor, which contrasts Rhythm, Sentimentality and Representational Accuracy with Atmospheric Effect, Symbolic Expression, Tension and Brilliance of Colouring. This may be called the Technical Factor. Liking and Religious Feeling are ambiguously placed, and fail to contribute clearly to the differentiation of aesthetic and technical attributes. The position of Rhythm may be surprising, but it is probably due to the failure of the majority of the subjects of the experiment to be sensitive to the true nature of aesthetic rhythm. Among musicians there is a strong tendency to confuse rhythm with the pattern of beats, an error equivalent to thinking of the rhythm of poetry as if it were identical with metre.

The first or general factor expresses the subjects' responses to the most essential and generalized attributes of artistic works, whether pictures or music. It combines genuineness of emotional expression with harmony of form and design, and unites the intellectual

¹ I am indebted to Miss Dorothy F. Lawson and Mr Joseph F. Simpson for help with the correlations in both experiments, and to Miss Lawson and Dr P. E. Vernon for the factorial analysis of the correlations between qualities in the music experiment.

and emotional qualities of art. It suggests that this combination is in fact the essence of art, and it strongly supports the hypothesis stated at the outset, that the essential attributes of artistic expression and appreciation are (a) the harmonious integration of emotional tendencies, which, unlike Clive Bell's "aesthetic emotions" (5) are not themselves exclusively aesthetic, and (b) harmony of visual, auditory or other aspects of form, and design. It is therefore called the Aesthetic Factor.

The second or bipolar factor has been called the Technical Factor because it shows the subjects' responses to different methods of expressing the essential unity of emotional qualities and design. Thus a strongly metrical pattern may or may not be used in music, a painting or piece of music may or may not be pleasing, sentimental or accurate in photographic detail, but it can still be essentially artistic. Similarly, impressionism, brilliance of colouring, the use of symbolical modes of expression and musical tensions are devices of the artist, while appreciation through vivid imagery is probably to be viewed as a device of the listener, not necessarily characteristic of the majority. Different temperaments, as Eysenck has shown, and also differences of style, convention and tradition widely employed in art, are expressed in the bipolar factor. Whatever variations in the mode of expression are used to satisfy different temperaments, however, the central qualities of art are still to be found in the use of form and design to express feeling and emotion. Eysenck's terms for his factors were 'T' or 'good taste' for the general factor and 'K' or 'colour' for the bipolar. In view of what has been said in this paper, however, the expressions 'Aesthetic' and 'Technical' would be much better: 'Aesthetic' for the general factor, which represents responses to the effective expression of feeling and emotion through harmoniously organized forms and designs; 'Technical' for the bipolar factor, which differentiates various methods of gaining the essential artistic end.

VI. SUMMARY AND CONCLUSIONS

Two simple experiments were carried out in order to test the hypothesis that the essential attributes of art and of aesthetic appreciation are the integrity of expression of emotions and the use of harmoniously organized forms and designs. One experiment was on the appreciation of pictures and the other of music.

In the pictures experiment, 59 subjects, drawn from W.E.A. and University psychology classes, rated 18 pictures on a 7-point scale for eight possible aesthetic qualities. The pictures were carefully chosen to represent as great a variety of styles, qualities and modes of expression as possible, and the eight qualities were carefully selected and defined. The results were intercorrelated and factorized for qualities. There was little difference between the University and the W.E.A. groups.

In the music experiment, 16 gramophone records representing modern, classical, romantic and jazz music of various combinations of instruments, and also songs, were used. In this experiment the pieces of music were again rated on a 7-point scale, this time by 58 University psychology students, for ten possible aesthetic qualities, four of which were the same as in the pictures experiment. Again the results were factorized for qualities, and little or no difference was found between men and women.

The results of the two experiments taken together show two factors: a general or Aesthetic Factor, which combines form or design with emotional expression; and a bipolar or Technical Factor, which contrasts rhythm, sentimentality and accuracy of representation with impressionism, colourfulness and symbolic qualities. These factors may

correspond with Eysenck's and Peel's factors in aesthetic appreciation, although emotional expression was not taken into account by these writers.

The experiments gave decided support to the hypothesis tested, and suggest that art is essentially the combination of emotional expression with harmonious design, while there are impressionistic, naturalistic, symbolical, colourful and other ways of achieving this end.¹

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¹ Since this article was written a further experiment has been carried out, using a larger number of pictures and a smaller number of subjects. By kind permission of the Curator, Mr. R. E. Hutchison, forty-five pictures were selected in the Eighty-fifth Exhibition of the Royal Glasgow Institute of the Fine Arts, 1946. The use of originals, all about 3 × 4 feet in size, scattered among the 716 exhibits, was a decided advantage. The writer is grateful to Dr. T. J. Honeyman, Director of the Glasgow Art Galleries, for his co-operation in arranging the experiment. Eighteen judges were selected because of their interest in the psychology of art. They were provided with record sheets as before, and rated the pictures on a seven-point scale for the following qualities: harmony of design, harmony of colouring, atmospheric effect, emotional expression, interest of subject-matter, rhythm and/or movement, photographic accuracy, sentimentality, expressive distortion or symbolic effect. The ratings were inter-correlated as before and factorized for qualities. The results were essentially the same as in the previous experiments (6).

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THEORY OF THE HUMAN OPERATOR IN CONTROL SYSTEMS

II. MAN AS AN ELEMENT IN A CONTROL SYSTEM¹

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I. *Statement of the problem* (p. 142). II. *How the problem may be investigated* (pp. 142-143). III. *The first two steps in the chain of response* (pp. 143-148): (a) *The sense-organ* (pp. 143-145); (b) *The computing system* (pp. 145-148). *References* (p. 148).

I. STATEMENT OF THE PROBLEM

As an element in a control system a man may be regarded as a chain consisting of the following items:

(1) Sensory devices, which transform a misalignment between sight and target into suitable physiological counterparts, such as patterns of nerve impulses, just as a radar receiver transforms misalignment into an error-voltage.

(2) A computing system which responds to the misalignment-input by giving a neural response calculated, on the basis of previous experience, to be appropriate to reduce the misalignment; this process seems to occur in the cortex of the brain.

(3) An amplifying system—the motor-nerve endings and the muscles—in which a minute amount of energy (the impulses in the motor nerves) controls the liberation of much greater amounts of energy in the muscles, which thus perform mechanical work.

(4) Mechanical linkages (the pivot and lever systems of the limbs) whereby the muscular work produces externally observable effects, such as laying a gun.

Such considerations serve to bridge the gap between the physiological statement of man as an animal giving reflex and learned responses to sensory stimuli, and the engineering statement in terms of the type of mechanism which would be designed to fulfil the same function in a wholly automatic system. The problem is to discover in detail the characteristics of this human chain, such as its sensory resolving-power, its maximum power-output and optimum loads, its frequency-characteristics and time-lags, its amplitude-distortion and whether or not internal cyclic systems enter into it, its flexibility and self-modifying properties, etc., with a view to showing the various advantages and disadvantages of the human operator as compared with an automatic system.

II. HOW THE PROBLEM MAY BE INVESTIGATED

The following are some of the techniques available for studying the human operator as an element in a control system:

(1) We may set him the task of tracking a real target and record his errors by a cine-camera mounted on a gun, and later plot the actual course of the target from knowledge of the motion of the gun and the laying errors at each moment. His performance with different types of control systems can thus be compared, and *ad hoc* results obtained.

¹ The first part of this paper appeared in this *Journal* (1947), xxxviii, 56-61.

(2) We may set him the task of tracking an artificial target following a predetermined course, e.g. by connecting a differential gear between a shaft whose angular rotation is determined by a cam and represents the course, and his control handle; his task is to keep a pointer fixed to the jockey of the differential on a stationary point, and so to balance the target-shaft motion. The movements of this pointer can be recorded on moving paper and will indicate his errors. This method has many advantages of simplicity and cheapness, and makes it possible to repeat exactly the same target-course on successive occasions. Electrical, hydraulic, and pneumatic equivalents of this mechanical system are of course feasible. We can also set 'unnatural' courses containing step-functions, sudden applications of constant velocity to the target, sinusoidal motion, etc., in order to reveal particular characteristics of the operator's performance.

(3) We can attempt to isolate various steps in the chain composing the operator's response. For instance, by suddenly concealing the display we can break into the cycle of operations and momentarily determine the relation between input and output in the 'straight' system—or at least with the system containing only internal feedback such as that provided by kinaesthetic sensations (sensory indications of how far a limb has moved). We can determine the limiting resolving power of the sensory system—e.g. visual acuity—the smallest movements a limb can make, and the maximum power of the limbs with their muscles, by magnifying levers. Physiologists have some techniques, such as recording nerve impulses in sensory and motor nerves and in the brain by means of amplifiers and oscillographs and stimulating motor nerves electrically, which are of great physiological interest, but have as yet, owing to technical difficulties, yielded insufficiently quantitative data to be of great assistance in deriving mathematical laws for the operating characteristics of the human being in a tracking task.

III. THE FIRST TWO STEPS IN THE CHAIN OF RESPONSE

(a) *The sense-organ*

The eye is almost invariably the most suited for tracking tasks, owing to its high sensitivity and resolving power, its two-dimensional and even three-dimensional appreciation of objects. It can detect misalignments as small as 5 sec. of arc (as in vernier scales and coincidence range-finders) and can distinguish between neighbouring lines 1 min. of arc apart, and it has great power of appreciation of form or pattern, e.g. in distinguishing a tank from the surrounding country, or an enemy aircraft from a friendly one. Only in the distinguishing of a constant frequency from a mixed-frequency background—as in detecting Asdic echoes—or in distinguishing a rhythmic modulation from a steady background of mixed frequencies—as in the beating of a submarine's propellers picked up by a hydrophone—is the ear superior to the eye, and therefore is used for tracking some targets in the early stages of the attack. Occasionally the naked eye may be a limiting factor in tracking—e.g. in visual night air-to-air gunnery—but telescopic sights, radar displays of target position, etc., often exceed this limit.

The first problem we meet in analysing the performance of the visual sense-organ is: 'What is the quantitative relation of the angular misalignment between sight and target to the message sent up the optic nerve as "input" which activates the rest of the human operator-system?' Unfortunately, very little is known about this, except that the receptive surface at the back of the eye contains a mosaic of individual receptors which

are individually connected to nerve-fibres, in the region which has the highest resolving power, and that the fineness of this mosaic corresponds roughly with the resolving power of the eye. But how a misalignment between two objects in the retinal image produces something equivalent to the 'error voltage' in a radar set is not known. The problem is further complicated by the fact that the misalignment-image need not fall on the same set of receptors from moment to moment—i.e. tracking can go on in spite of small eye-movements; and of course the particular misalignment to which the operator responds depends on his training and his orders at the time.

Thus, if he is an A.A. gunner he disregards the misalignment between his sights and various enemy tanks or infantry which may be within view, and enemy aircraft apart from that which he is ordered to attack. His training and his orders act as some kind of selector switch in the brain in a way which is completely unknown. It is possible, however, to show that the operator has some quantitative appreciation of the misalignment; he does not act as if he merely had an on-off wiping contact which indicated satisfactory alignment or an unknown degree of misalignment; and he also appreciates the sense or direction of the misalignment. This can be shown by presenting cards with cross-wires and target-dots at various misalignments and asking the operator to state the size of the misalignment when it is compared with a standard misalignment card presented alternately. Ability to do this varies with training and with the time interval between each presented misalignment and the next; but when the cards are presented for 3 sec. each at intervals of about 1 sec., the relation between the physical value of the misalignment and the subjective estimate of it is as in Fig. 1, which gives the mean values for 10 subjects. It is important in such experiments that the cards should all be presented at the same distance from the eye, otherwise a curious conflict occurs between estimation of the angular misalignment and the actual misalignment in units of length on the card. Thus, if we show an unsophisticated person a card pinned to the wall at 15 ft. and ask him to say which of several sizes of cards, which we hold up in turn at a distance of 7 ft., is equal to it, most people will choose some size intermediate between physical equality and angular equality (i.e. half the linear dimensions) with considerable consistency. This type of perception was called 'phenomenal regression' by its discoverer, Thouless (1931), and represents an attempt to compromise between judging physical sizes of objects, which is usually the more important, and their angular size which may more occasionally be required.

Thus we may conclude that under suitable conditions the human operator can appreciate the angular size of a visual misalignment to an accuracy of about 10 %.

The next point is whether the eye is responding continuously to this misalignment. In a task such as reading, where we wish to observe different parts of the field successively, it can be shown by photography that the eye makes jerks, or 'saccadic movements', having a mean duration of 0.03 to 0.05 sec., interspersed with pauses of about 0.3 sec., during which alone the retinal image is sufficiently distinct to be appreciated, under normal circumstances. Thus the eye operates intermittently in a task such as reading. In tracking a target, however, similar photographs show that the eye fixates the aiming-point on the target as steadily as possible, whether the target is stationary or moving, and it can be shown by electrophysiological methods that sensory messages are being sent continuously up the optic nerve. But we shall see later that continuous response by the sense-organ does not imply that the human operator as a whole responds continuously.

It may sometimes be desirable, however, to attempt to smooth rapid variations in misalignment, such as may be set up by fading in a radar receiver, or vibration and bumping in tanks and aircraft; partly in order to reduce the blurring of the misalignment in the retinal image, and partly to eliminate those momentary changes in misalignment which are too rapid for the operator to be able to cope with by useful corrective action. This, as we shall see later, is a much slower process, and elimination of rapid oscillations in misalignment may improve the operator's performance by removing his temptation to try to achieve the impossible.

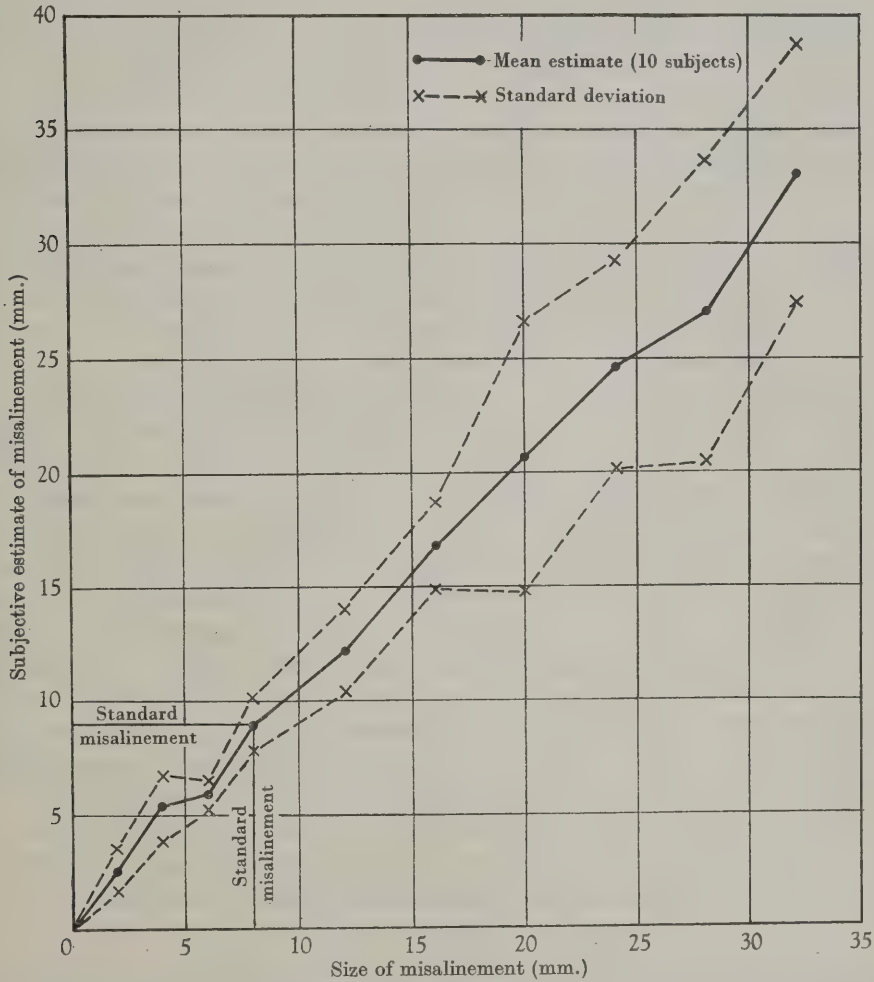


Fig. 1. Relation between the physical value and the subjective estimate of the misalignment.

(b) *The computing system*

In psychological terminology, the operator learns the feel of the controls and finally makes the control-movements which he judges to be appropriate for reducing the misalignment as much as possible. Viewed objectively, this process consists of a modification of the relation between the input, or optic-nerve message, representing the angular misalignment, and the output, or limb-movement. If no instruction is given, it may take

the form of trying and then abandoning various unsuitable methods of moving the controls, for instance with the unsuitable hand, or with an awkward grip, or by action in the wrong direction. There then follows a period of quantitative modification of the ratio of control-movement to the misalignment—i.e. a modification of the 'stiffness' or amplification of the system—and finally there may be an appearance of complicated temporal patterns of control-movements in response to a misalignment, having the object of compensating for the defects of the operator (such as his time-lags) or of the control-gear (such as backlash, striction, and inertia), or overcoming physical limitations such as the time of flight of the projectile (as in aiming off with a shot gun at a flying bird, where no specific rules for aim-off are given). Thus, viewed from the outside, and regarded as a mechanical system such as we should design to operate in the same way, the operator's brain appears as a computing system and amplifier, with variable characteristics and a variable switch-gear between its different input and output elements. For this reason it is not possible to give a single equation which will express the brain's behaviour under all circumstances and at all stages of learning. From the practical point of view the most important points to study are probably (a) the 'natural' or untutored response of the human operator to misalignments; (b) the time taken to modify this so as to reach a steady level of performance on any particular kind of control gear; and (c) the limits and defects of his performance when this steady state has been reached. All these points bear on the design of equipment as well as on the training of the operator.

The first and most marked feature of the cerebral process is its time-lag or 'central delay'. The time-lag between the occurrence of a stimulus such as a flash of light, and the most rapid response the operator can make—such as pressing a morse-key—has been measured by psychologists since the last century; for a single visual stimulus it averages about 0.18 sec., when a warning signal has been given before. When there is no warning, and when the stimulus takes some time to build up, as with a pointer gradually going out of alignment with a mark, and where the operator has a choice of the direction in which to make his corrective movement and also to some extent of its magnitude, so as to try to match this to the misalignment magnitude, it will be slower—about 0.3 sec. Further, in the effort to make a precise and graded response movement he will move the control less rapidly than in pressing a morse-key and the movement itself may take about 0.2 sec., making about 0.5 sec. as the average duration of the whole process. Physiological studies of the response time of the eye and the time taken for impulses to be transmitted up the optic nerve show that these can account for about 0.01 sec. only, and electrical stimulation of motor nerves and records of the start of the limb-movement which results show that this accounts only for another 0.01 sec. approximately. There are left about 0.28 sec. to be accounted for in cerebral processes. Practically nothing is known of these, except that the nerve impulses travel through a number of 'synapses' or junctions between nerve-endings which show a delay of about 0.0007 sec. each. These junctions transmit nerve-impulses in one direction only, from sensory to motor nerves, unlike nerve fibres themselves, which transmit either way. Synapses thus resemble electrical rectifiers; they also store up incoming impulses over periods up to 4 sec. and liberate a stream of outgoing impulses which may outlast the incoming volley by some 5 sec.—the after discharge. Thus they alter the time relations of the incoming impulses. They also show variations in ability to transmit impulses—generally a decrease after repeated stimulation—analogueous to a rise in electrical resistance in a circuit. These changes are often regarded

as the basis for a 'switching' mechanism which would account for learning and modification of behaviour. But all the resistance-changes so far detected are much too short for this, and it is likely that other types of alteration in synaptic resistance are involved in the living animal.

We must therefore ask ourselves whether this delay is more likely to consist of the transmission-time of nerve impulses continuously travelling down an immensely long chain of nerve-fibres and synapses connecting sensory and motor nerves, or of a 'condensed' time-lag occurring in one part of the chain. If the first hypothesis were correct, there would seem to be no reason why a continuous stream of incoming impulses should not evoke a continuous stream of motor ones, just as impulses can follow each other closely in a nerve-fibre or fairly closely even in a synapse. If, on the other hand, the time-lag is caused by the building up of some single 'computing' process which then discharges down the motor nerves, we might expect that new sensory impulses entering the brain while this central computing process was going on would either disturb it or be hindered from disturbing it by some 'switching' system.

These ideas can be tested to some extent by recording the human response to a series of discrete stimuli—such as flashes of light—presented at various time-intervals, to see whether there is a minimum interval within which successive stimuli cannot be responded to. Such an experiment is analogous to physiological investigations of the 'refractory phase' of a nerve or synapse, as pointed out by Telford (1931). The results of Telford and of the writer suggest a refractory period of about 0.5 sec., such that a stimulus presented within this interval after the preceding one is responded to later, or may be missed. If, again, the second stimulus succeeds the first very rapidly—within about 0.05 sec.—it and the first may be apprehended together and responded to as a single one, as if it had registered before the computing system had started to operate. Stimuli coming in between these two time-intervals are either disregarded, responded to after the first, or cause general disturbance and conflict in the operator.¹ The result is to set up a response frequency of about 2 per sec.

It is clear that this limit to response frequency is not determined by the sense-organ as pointed out above, or by the muscle and limb, since a finger can be moved voluntarily as fast as eight times a second, or faster by electrical stimulation; it must apparently be a cerebral limit. Certainly it is possible to make successive movements at a greater pace, as in transmitting morse, typewriting, playing the piano, etc., but in such cases it seems as if either the groups of stimuli composing letters of morse, for instance, must have been learned previously and that these groups then become single 'stimuli' with which the computing system deals as wholes, or, as in the case of reading music, that the page must be open in front of the player so that he can take in a few notes in succession as one group and respond to them as a unit. He could not play a piece at sight so fast if each note were exposed in turn by a moving shutter.

Thus the operator, in tracking, responds intermittently, at a frequency of about 2 per sec. Signs of this are often clearly visible in the records, particularly of untrained operators, and it would appear that when it is less evident, in experienced operators, this can be accounted for in terms of the superposition of a smooth movement, thought to be appropriate to the circumstances, and does not indicate any cessation of their basically

¹ For more detailed experimental evidence see the article by M. A. Vince in this *Journal* (1948), xxxviii, 149.

intermittent response. This conclusion puts the human operator into the class of 'intermittent definite correction servos' apprehending a misalignment, making a single corrective movement, and so proceeding. The next task will be experimentally to analyse the operator's performance, as such, and to see how it is affected by central delay and by distortions or variations in the quantitative relationship between the misalignment at a moment when it is apprehended and the movement which results from it.

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(Manuscript received 1 April 1945)

THE INTERMITTENCY OF CONTROL MOVEMENTS AND THE PSYCHOLOGICAL REFRACTORY PERIOD¹

By M. A. VINCE, *From the Psychological Laboratory, University of Cambridge*

I. *The problems* (p. 149). II. *Preliminary experiments: Corrective periods in tracking records* (pp. 149–151): (1) *Procedure* (p. 149); (2) *Results* (pp. 150–151). III. *Experiment IV: Psychological refractory period* (pp. 151–156): (1) *Procedure* (pp. 151–153); (2) *Theoretical results* (pp. 153–154); (3) *Experimental results* (pp. 154–156); (4) *Discussion* (p. 156). IV. *Conclusion* (pp. 156–157). *References* (p. 157).

I. THE PROBLEMS

Most tasks do not consist of reactions to single stimuli spaced at intervals of a few seconds; ordinarily, for example, when dealing with a control mechanism (as in tracking a moving target) the human being has to attempt to follow a continuous series of stimuli, or a continuously changing stimulus. Two main questions then arise:

(1) Does the operator respond continuously or intermittently?

(2) If he responds intermittently, how long is the psychological refractory period, i.e. how long must elapse after the presentation of one stimulus before a response can be initiated to the next stimulus in the series?

Telford (1931) has already pointed out that in a rapid series of stimuli the ordinary reaction time to auditory signals can be increased by 0.1 sec. by reducing the time interval between stimuli from 1.0 to 0.5 sec.

II. PRELIMINARY EXPERIMENTS: CORRECTIVE PERIODS IN TRACKING RECORDS

(1) *Procedure*

Experiment I. In Fig. 1 A is reproduced a typical record obtained when the subject is required to wind a balanced handwheel at a constant speed. The aim of the subject was to maintain a pointer steady on a straight circumferential white line drawn on a rotating smoked drum. The pointer was actuated by a motor, so that it moved steadily away from the line, and required a compensatory movement of the handwheel at a rate of 1 r.p.m. to keep it on the line.

Experiment II. In Fig. 1, B, C and D show records made in carrying out similar tasks; but in these cases the pointer was actuated by a cam (three different cam courses were used and are shown in the record in each case), which caused the recording pointer to move according to a predetermined course. The subject could compensate for the pointer movements by moving a handle up or down, and his task was to keep the pointer on a horizontal white line previously drawn on the smoked drum.

Experiment III. Using the apparatus of Experiment II, and the cam course illustrated in Fig. 1 B, eight subjects were given the same task, at five different drum speeds: 4, 10, 20, 50 and 100 mm./sec.

¹ These experiments were carried out under the direction of the late Dr K. J. W. Craik, Psychological Laboratory, Cambridge (see Craik, 1947, 1948).

(2) *Results*

The tracking records illustrated in Fig. 1 all exhibit a periodic or 'wavy' characteristic, which appears to be independent of the rate and shape of the course, and which shows a predominant frequency of about 0.5 sec., with smaller amounts of frequencies from just less than 0.25 to just over 1.0 sec.

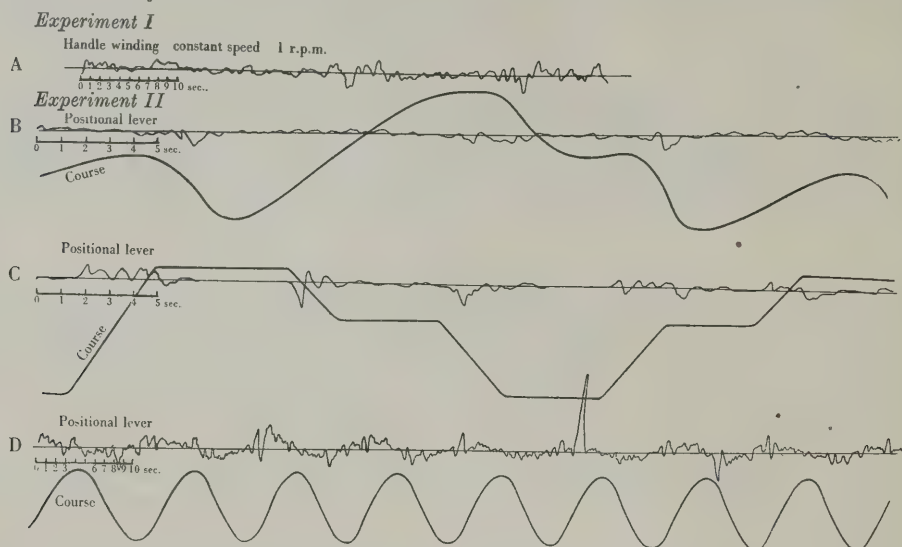


Fig. 1. Errors in tracking various types of course.

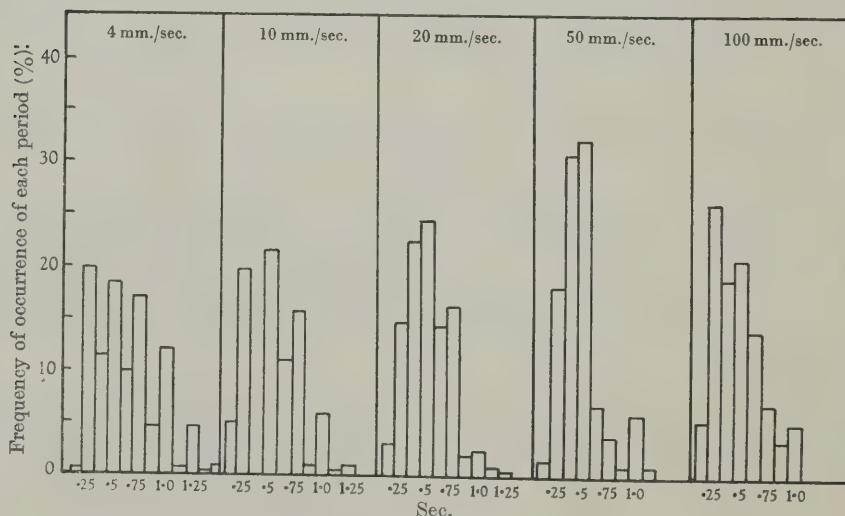


Fig. 2. Experiment III. Periodicity of corrections at various rates (8 subjects).

This periodicity is a common feature of tracking records, being more marked in the performance of unpractised subjects, and indicates that the subject is making a series of intermittent corrective movements separated by short pauses when, as can be seen from the records, the pointer continues on its course unchecked.

Periodicity of this kind might be attributed to a sensory threshold, such that misalignments smaller than a certain value would fail to be perceived; but there is evidence

against this. First, the display was such that the misalignments which were allowed to occur greatly exceeded the known visual acuity threshold. The average misalignment with the slowest drum speed in Experiment III was found to subtend a visual angle of 12 min., and this is more than twelve times greater than the smallest visually separable angle. Secondly, increasing the *rate* of the course had little effect on the periodicity of the corrections (see Fig. 2, Experiment III), while if their periodicity had been determined by the time taken for the misalignments to reach a certain 'threshold' value, this increase should have shortened the periodicity of the corrections.

Also there is a very high correlation between the mean error in tracking and the rate of the course ($r=0.95$). This may be accounted for by saying that the faster the course the greater the misalignments that occur in each period between two corrective movements in strict proportion.

It would appear, therefore, that this periodicity is a basic feature of the human being's response to a continuously changing misalignment; he makes a series of intermittent corrective movements, which begin, on the average, at intervals of half a second. It was next decided to investigate the hypothesis that this is caused by the stimulus (the misalignment) setting up a refractory period in the sensori-motor system, so that, until a certain period has elapsed (in this case until the response is completed) he becomes *unable* to respond to any further data.

III. EXPERIMENT IV: PSYCHOLOGICAL REFRACTORY PERIOD

The aim of this experiment was to present a series of stimuli at varying time intervals in order to ascertain the shortest interval within which a second stimulus is likely to be responded to normally. If, for example, two stimuli are presented in rapid succession, is there any delay longer than that of the normal reaction time,¹ before the response to the second can be initiated?

(1) *Procedure*

A thin black line was drawn on a horizontal band of white paper on a drum which moved at a rate of 50 mm./sec. The drum was screened except for a narrow vertical slit which allowed the subject about 0.05 sec. warning² of any change in the direction of the line. The subject was provided with a recording pointer which he grasped between forefinger and thumb, and could move up and down in the slit, and his task was to keep the pointer as nearly as possible on the line. The recording pointer consisted of a pencil point attached to a sliding collar on a rod placed in line with the slit.

The line to be followed was continuous and horizontal except for a series of steps, which went either up or down, and were all of the same height, 2.5 cm. The subject was thus able to hold his pointer stationary until he became aware of a sudden shift in the position of the line, when he had to move the pointer up or down as quickly as possible in order to get on to the line again. Each step thus provided the subject with a stimulus for a rapid, discrete response. The direction of the steps and the time interval between them were varied as far as possible at random.

¹ Throughout this paper the term 'reaction time' is intended to signify the time interval between the presentation of a visual stimulus and the beginning of the response to that stimulus.

² This warning period of 0.05 sec. has not been allowed for in any of the data given below.

From time to time in the record a pair of stimuli consisting of a step in one direction, followed by a horizontal line, and then a step in the opposite direction, was interposed. The length of the horizontal line between these two steps represented one of a chosen series of time intervals. The subject was thus presented with two stimuli, requiring opposite responses, and in quick succession. This series of paired stimuli, with intervals ranging

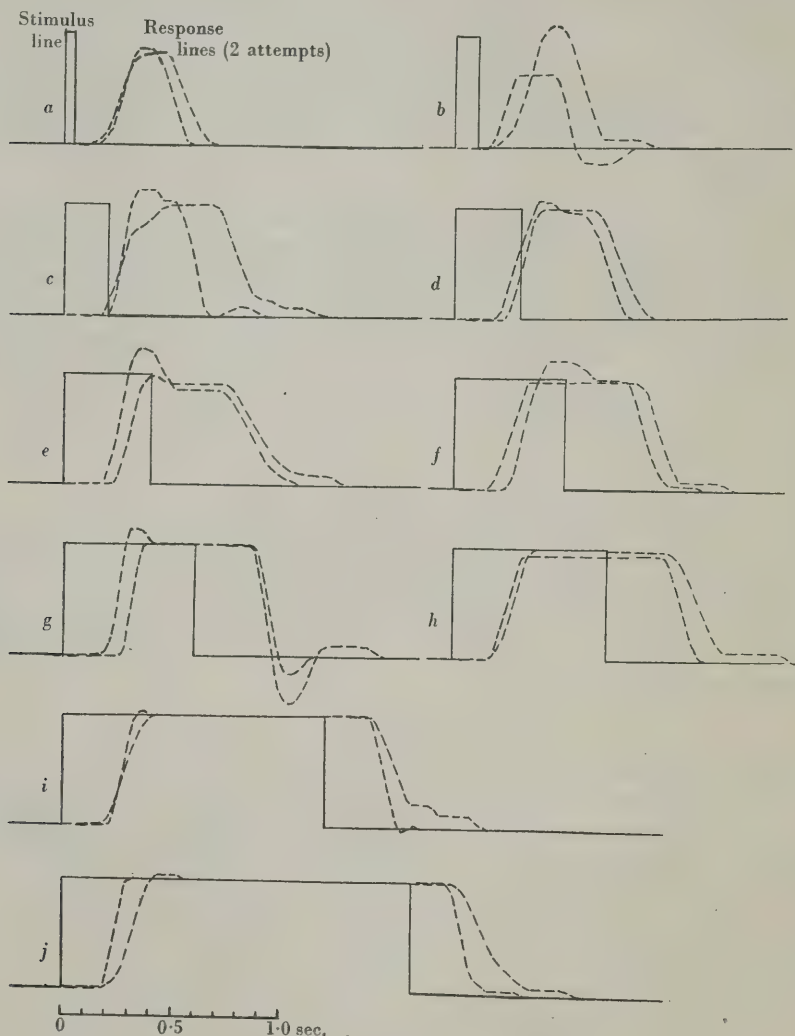


Fig. 3. Typical responses.

from 0.05 to 1.6 sec., is illustrated in Fig. 3 (unbroken line). The time intervals between the first and the second steps (or stimuli) were 0.05, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 1.2 and 1.6 sec. (in Fig. 3 unbroken stimulus lines *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i* and *j* respectively). The broken lines in Fig. 3 represent typical responses made by the subjects; two typical responses at each time interval.

The responses to these particular paired stimuli provided the data given below. The

reaction times, and response, or movement times, were easily measured from the record, since 5 mm. represented 0.1 sec.

(2) Theoretical results

Fig. 4 A is plotted on the hypothesis that the human being can behave continuously except for the delay caused by his reaction time; here the reaction time is taken as 0.25 sec. in every case, and the movement time as 0.2 sec., and each response is represented as a perfect sigmoid approach to the line.

In this diagram the paired stimuli have been superimposed so that the timing of responses expected after the different time intervals may more easily be compared. Here X denotes the first stimulus line in each step and *a, b, c, d, e, f, g, h, i* and *j* the second stimulus lines for the return movements at the various intervals. The points

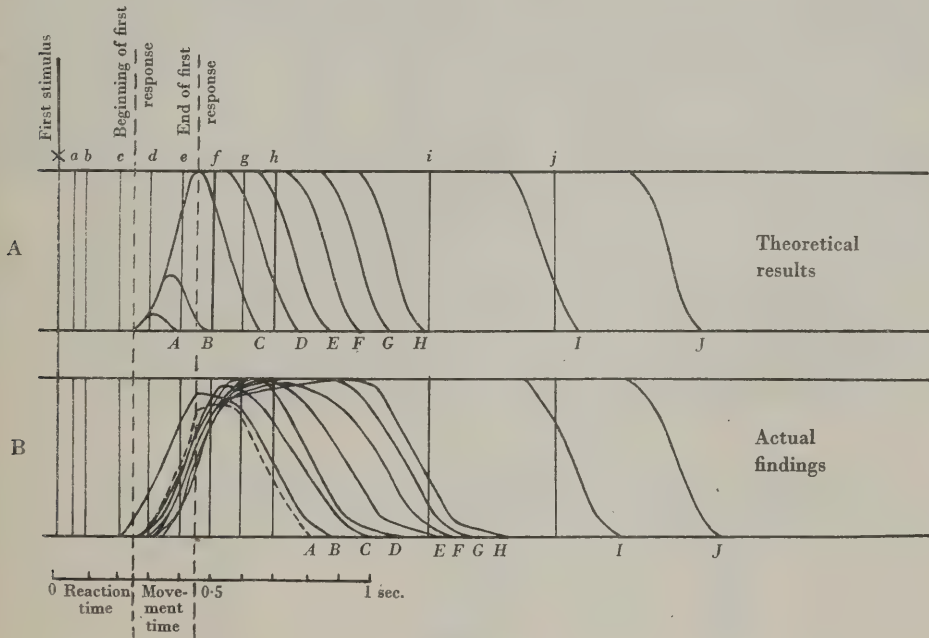


Fig. 4.

marking the expected end of the initial reaction time (the beginning of the first response), and the expected end of the first response, are marked in the diagram by dotted lines. The first response to the first stimulus is drawn in normally at the end of the first reaction time. The responses A-J denote the theoretical responses to the second stimuli in each step. If the human being can respond at any time to a stimulus regardless of its position in a series of stimuli, then the second response should also begin as soon as a single reaction time has elapsed after the second stimulus. The return responses C, D, E, F, G, H, I and J are shown as normal, because in these cases the first movement should be completed before the beginning of the second response is expected.

In the case of the stimuli *a* and *b*, however, which occur in the early part of the reaction time to the first stimulus X; the beginning of the second movement should occur before the first movement has been completed. On the assumption that the first movement would be terminated by the beginning of the second, the return to the base line will

begin at the end of the usual reaction time to the second stimulus, thus curtailing the initial response.

(3) *Experimental results*

The results described below were obtained from the actual responses made to the paired stimuli such as those drawn in Fig. 3, *a-j*. These results indicate that the lag caused by a simple reaction time was not sufficient to explain the delayed responses which occurred when stimuli were presented at intervals of 0.5 sec., or less. This may be seen by comparing Fig. 4 A and B. Fig. 4 B was obtained by averaging the responses made by twelve subjects (about 30 responses at each interval) and thus gives a rough picture which can be compared with the theoretical diagram. It will be noted that the responses to the first stimulus X tend to superimpose, and that, whereas at the longer intervals the responses to the second stimuli occurred roughly where they were expected, those made at the shorter intervals were delayed, and on the average responses to the second stimulus did not occur until 0.5 sec. had elapsed after the presentation of the first stimulus. Also quick truncated responses of the types *A* and *B* in Fig. 4 A did not occur at all. Although a number of responses at the shorter interval appeared to have been curtailed by the appearance of the second stimulus, even in these cases the return movement was not begun until at least 0.5 sec. had elapsed after the appearance of the first stimulus (see Fig. 3 *b*).

The mean reaction times to the first and second stimuli in each pair are given in Table 1. The differences between the reaction times to the first stimulus X, and to the second stimuli *a* (0.05 sec.), *b* (0.1 sec.), *c* (0.2 sec.), *d* (0.3 sec.), *e* (0.4 sec.), *f* (0.5 sec.) are statistically significant, showing that the response to a second stimulus presented at an interval of 0.5 sec. or less, from the first, was delayed beyond the usual time.

Table 1

Interval in sec. between 1st and 2nd stimulus	Reaction time to first stimulus, in sec.	Reaction time to second stimulus, in sec.
0.05	0.29	0.51
0.1	0.22	0.43
0.2	0.28	0.41
0.3	0.29	0.40
0.4	0.28	0.34
0.5	0.26	0.32
0.6	0.31	0.34
0.7	0.32	0.33
1.2	0.32	0.31
1.6	0.34	0.26

There is, however, a considerable amount of overlap, as can be seen from the distribution diagram in Fig. 5. Although the shifting of the mean produced a significant difference, a few responses occurred 0.4 sec. or even less after the presentation of the first stimulus.

The time required to complete a single response (ignoring secondary corrective movements where these occurred) was measured, the mean being 0.22 sec., and the mean reaction time to the first stimulus X was 0.29 sec.

The types of responses made fell roughly into five classes:

(1) *No response.* This occurred only at the shortest interval, of 0.05 sec., where apparently the stimuli were close enough to be apprehended together.

(2) *The first response was modified* by the second stimulus in the direction of *under-shooting* (see Fig. 3 *b*).

(3) *The first response was modified* (in the direction of greater accuracy) by a *second movement* which was begun after the appearance of the second stimulus (as in Fig. 3 c).

(4) *The normal response.* The fairly accurate, sigmoid response, such as that made when the subject was not unduly hurried (as in Fig. 3 j).

(5) There was some evidence that in a few cases the response to the first stimulus was modified in the direction of *overshooting*. It will be noted, however, from Table 2, that a certain amount of overshooting occurred even when there was no interference, i.e. at intervals of more than 0.3 sec.

The possibility that the second stimulus or response might be missed could not occur in this experiment, since a return movement had to be made ultimately to the horizontal line.

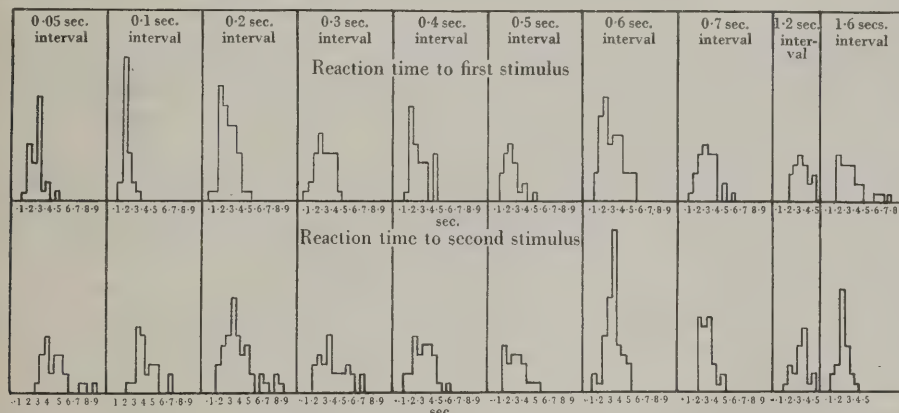


Fig. 5. Distribution of reaction times after various intervals.

The frequency of occurrence of each type of response is given in Table 2, below. The figures given are percentages of the whole number of responses, but, as a response sometimes fell into more than one category, the total of columns (1)–(5) is sometimes greater than 100.

Table 2

Interval in sec. between 1st and 2nd stimulus	(1) No response	(2) Percentage undershot (= -20 % of required movement)	(3) Percentage where a cor- rection to first stimulus appears after appearance of 2nd stimulus	(4) Normal response	(5) Percentage overshot (= +20 % of required movement)	Percentage where 1st response begins after appearance of second stimulus
0.05	21.21	33.36	0	42.42	10.71	100
0.1	0	20.68	24.14	58.63	11.11	100
0.2	0	32.26	12.90	58.07	18.52	90.32
0.3	0	9.37	25.00	56.25	9.37	37.50
0.4	0	13.51	21.62	64.86	8.82	10.81
0.5	0	6.45	22.58	83.87	14.30	3.22
0.6	0	3.23	9.68	80.64	0	0
0.7	0	0	2.86	88.57	7.69	0
1.2	0	0	0	100	17.24	0
1.6	0	0	0	100	4.76	0

The results may be summarized as follows:

When stimuli were presented in succession, a normal response was not usually made unless the interval between stimuli was more than 0.5 sec. When the interval between

stimuli was 0.5 sec. or less, a response to the second stimulus did not usually begin until 0.5 sec. had elapsed after the presentation of the first stimulus; in fact, the reaction time to the second stimulus was then lengthened to a statistically significant degree.

(4) *Discussion*

A possible hypothesis is that the delay caused by the reaction time in sensori-motor action is largely occupied by some central 'computing' system, during the course of which the appropriate response is selected and organized.

If, during this time, further sensory impulses were received, the 'computing' process would be disturbed, and the response disorganized; this appears to be prevented from happening by the fact that the reception of one stimulus renders the sensori-motor system temporarily refractory to stimuli of a similar kind. This refractory period appears to correspond to the duration of the reaction time. A second stimulus is not likely to evoke a second response until an interval of about 0.5 sec. after the appearance of the first stimulus has elapsed. During the reaction time, therefore, the sensori-motor system becomes refractory to similar stimuli.

However, at the end of the reaction time, and at the beginning of, or during, the response time, it is possible to begin organizing a new response to a second stimulus—to initiate a second reaction time. Even then, if the response to the first stimulus has not been completed before the presentation of the second stimulus, i.e. if an interval of 0.5 sec. has not elapsed between the presentation of the first and the second stimulus, the second response will be abnormal in so far as it is delayed to an unusual degree.

The minimum interval between stimuli (0.5 sec.) which allows a normal undelayed response to the second stimulus corresponds to the mean periodicity found in tracking records, where corrective movements are initiated at a rate of approximately one every half-second. It is not known whether this refractory period is a feature of the types of task used in the present experiments, where the reaction time and response time together last approximately 0.5 sec., or whether, as the results of Telford would suggest, it is a fundamental characteristic of the human being's response to any sequence of stimuli presented within determinable limits of rate.

According to these results, therefore, a stimulus is followed by a reaction time, during the course of which the sensori-motor system is refractory to similar stimuli, and a response time, in the course of which a new stimulus may initiate a new reaction time, although the beginning of the second response may be delayed. A second stimulus may be apprehended and responded to normally only if it appears when the response to the first stimulus has been completed, that is, half a second after the appearance of the first stimulus.

IV. CONCLUSION

In a task where the operator is presented with a continuous series of stimuli his response will appear to oscillate, at some rate of frequency which is, apparently, at least in pursuit tasks, dependent upon a refractory period, during the course of which a normal effector response to a second stimulus cannot be effectively initiated.

When a second stimulus is presented within an interval of 0.5 sec. of the first, the beginning of the second response is usually delayed until the completion of the first response, although there is some evidence that the first response may be modified slightly by the second stimulus.

An exception occurs when the interval between stimuli is less than 0.1 sec., when both stimuli appear to be apprehended and responded to as a unit.

This evidence, that a second effector response is not likely to be made until 0.5 sec. has elapsed after the presentation of the first stimulus, throws some light on the problem of the periodicity of corrective movements in tracking tasks, which is caused by a sequence of corrective movements at a rate of two per second.

I should like to make my acknowledgements to the Ministry of Supply, for whom this work was carried out; and to Prof. Bartlett, Dr Mackworth and Dr Hick of the Cambridge Psychological Laboratory, for their help and advice.

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(Manuscript received 1 May 1947)

PERSPECTIVES IN MODERN PSYCHOLOGY¹

BY T. H. PEAR

I. *Self-centred sciences* (pp. 158–159). II. *The social relations of the sciences* (pp. 159–160). III. *Important perspectives* (pp. 160–164): (a) *Nomothetic and idiographic* (p. 160); (b) *Personality, character and culture* (pp. 160–161); (c) *The relation of personality to character* (p. 162); (d) *Theoretical and practical psychologists* (pp. 162–164). *References* (p. 164).

I. SELF-CENTRED SCIENCES

In Emery Reves' *The Anatomy of Peace*⁽¹⁾ he illustrates, with many excellent examples, the self-centred point of view which each nation claiming national sovereignty takes when describing and accounting for its part in World War II. The wider 'Copernican' view, that the centre is merely relative, has not yet gained much popularity among political leaders. A similar parochialism characterizes the present mood of the different sciences, if for the moment, and for the sake of brevity, we may illegitimately attribute a mood to a science. This becomes apparent if the perspective of an informed student of one science is assessed from the standpoint of a student of another.

Let us, greatly daring, attempt this in regard to modern physicists. It is difficult to sketch their 'perspective', since there are many of them. Let us assume, however, that the science of physics is man's knowledge about certain aspects of the external world, or as Prof. N. F. Mott says, "the scientist to-day does not feel any more that he is investigating some absolute truth remote from mankind; and this too is probably why he feels instead that the subject matter of . . . physics is the relation between mankind and the rest of the world"⁽²⁾. Then, since to discover this relation the action of a human brain is indispensable, some people might suppose that a fair amount of the physicists' time and energy would have been spent in discovering the physical events which occur in man's thinking apparatus. Moreover, since the vogue of convulsive shock-therapy, in which simple electrical means cause startling changes in human personalities, one might have expected a consequent increase of interest in the physics of the brain and nervous system. Yet this does not yet seem to have happened on any appreciable scale.

These remarks are offered as illustration, not as criticism. Similarly, a psychologist who assumed that the average physiologist is specially interested in those aspects of physiology which perpetually challenge the psychologist, the workings of the body as a whole, or the relation of observable brain events to observable changes in experience, might find himself mistaken.

On reading this, a physicist or physiologist may reply that it is arbitrary for an outsider to assert that the above-mentioned aspects of physiology are those in which the physiologist 'ought' to be interested, and moreover that he has both a right and a duty to specialize. This would illustrate that different perspectives exist among students of what is called a science. Until recently, it was fashionable for most scientists to have their personal perspectives often kept narrow or sharply focused, for the conscious reason that this ensured one's work 'getting somewhere', and, occasionally, for the less conscious one that

¹ Amplified from a paper read before the Psychology Section of the British Association for the Advancement of Science, Dundee Meeting, 28 August 1947.

to be known among scientists as holding distinctive views seldom affected their holder's reputation adversely. Indeed, until a few years ago, to take a practical interest in the outlook of workers in other sciences was widely condemned as diffuse or even subversive thinking. Times have changed; interest in other people's business has become scientifically respectable, and the British Association for the Advancement of Science has established a special Section to encourage it.

Some thinkers urge that such problems can best be handled by a new branch of study, Human Relations, comprising psychology, sociology and anthropology, some branches of medicine and eventually, perhaps, economics as studied with reference to human culture-patterns. The reader will be reminded of the redistribution of 'subjects' in several American Universities, e.g. Harvard and Yale, and of the work of the Tavistock Clinic in England. Requisite for the study of any science is obviously some kind of perspective. But, to paraphrase Prof. Robert S. Lynd⁽³⁾: Perspective for what?

II. THE SOCIAL RELATIONS OF THE SCIENCES

Most well-informed people probably now realize that the 'social relations' of the sciences must be taken as seriously as the sciences themselves—if scientific and non-scientific men wish to go on living. Yet perhaps a social psychologist may describe the situation from his standpoint, and suggest a more modest if less comforting title: "The social relations of living scientists". Science is knowledge, not laboratories, apparatus, records, books, libraries or Associations. Annihilate every thinking person and you obliterate science, leaving only its potentialities—if Nature should give Man a second chance. Moreover, since nowadays no single person can apprehend all the knowledge subsumed under 'science' it may be justifiable to say with Prof. John Macmurray⁽⁴⁾, that there is no Science but only a collection of sciences.

The psychologist may put this in another way; in the minds of certain scientists and philosophers there is a collection and occasionally an integration of important systems of knowledge. To contemplate this fact arouses optimism and pessimism. Optimism because the works of writers like Bertrand Russell and A. N. Whitehead show that they are trying, with considerable success, to expound what scientists are or were recently thinking; pessimism, because many scientists tirelessly invent methods of investigation, name and modify them, while the philosopher follows, not always post-haste, discriminating and labelling these, and, perhaps, assessing their value for some specific purpose. This work is obviously important, yet it is difficult to name a philosopher competent to give a bird's-eye view even of recent methods and standpoints in physics and psychology, and to indicate their important relationships. Has any philosopher evaluated the significance of psycho-analysis and its derivatives, factor-analysis, the developing concepts of culture-pattern, mass-observation, participant observation, polls of attitude and opinion, and the many studies of individual personality and character which ought eventually to interpenetrate all these? Where shall we find one person willing to appraise neo-behaviourism, field-theories, *Gestalt*, logical positivism—need I continue?

The 1947 *Encyclopaedia of Psychology*⁽⁵⁾ contains an index to articles on points of view, frames of reference, schools of psychology, but to no essay which fits these into a comprehensible pattern. And it is the psychologist who seldom writes "Psychologists say..." He is apt to leave this phrase, in England at least, to literary men and popularizing theologians.

The reader may reasonably ask: Will not any one psychologist inevitably have his own perspective, or, for different purposes, perspectives, and may not the present writer be struggling against this difficulty? Obviously, yet at any one time and place, one perspective may be more urgent or important than all others. To an air-pilot, fifty thousand feet up, the jagged chain of the Alps may cause no apprehension; to one about to land in the Fen District, a steeple one hundred feet high may focus his interest. I will, therefore, concentrate upon certain psychological perspectives which to me seem important here and now, and omit others equally interesting to the general theorist.

III. IMPORTANT PERSPECTIVES

(a) *Nomothetic and idiographic*

Psychologists, both here and in America, are often distinguished by the emphasis, theoretical and practical, which they place upon one of two aims: the discovery of general laws of mind, or the description and understanding of the unique undivided personality. It is unnecessary to combat here the dogmatic assertion that to deal with individual cases is not the function of science. In *Personality* (6), Prof. Gordon Allport answers that one task of science is to discover how uniqueness, and not only the uniqueness of man's mind, comes about.

Many psychologists to-day seem only faintly interested in uniqueness. Yet few would hold that, if they were investigating the mind of a highly intelligent, trained burglar, it would be more important to know where his intelligence-quotient came on a frequency curve, than if burgling was a family profession. A prison governor said recently, that when asking an old 'lag' why he went on getting locked up for this crime, the polite reply came, "It's my job, sir—like yours".

A few tests of musical ability, if applied to a gifted student from a small conservatoire and to Artur Schnabel, might give rather similar results, yet the ways in which the particular abilities thus measured combine with each other in the make-up of the single personality are much more important than a quantitative assessment of any single one. To the reasonable answer that well-balanced psychologists ought to keep in mind both the nomothetic and idiographic aims, it may be replied that, judged by their publications and not by their conversation, few psychologists succeed.

(b) *Personality, character and culture*

Since this subject involves problems of 'figure' and 'ground', it implies perspective in the literal sense of that word. Different psychologists see varying degrees of significance not only in the study of Personality and its relations to what, in England, is termed 'Character', but also in the cultural context in which these are studied. This development has recently been expounded by Prof. Ralph Linton in *The Cultural Background of Personality* (7) and by the present writer in "Personality in its Cultural Context" (8). To substitute 'context' for 'ground' emphasizes that to appreciate a personality (in the Paterian sense) implies more than to perceive a figure against its ground. This fact is increasingly recognized in personnel studies, especially those made by psychiatrists. The study of Personality-in-Culture is a special discipline, linking up anthropology, ethnology, sociology, psychology and, possibly, ethics.

To those who restrict their scientific activities to sharply focused experiments, the

above may imply a depressing extension of the psychologist's 'real' problems to include the whole of knowledge. Yet 'culture-pattern' investigations show how valuable are the results when such specialists from different fields co-operate. These researches not only yield valuable information but suggest methods of investigation applicable to members of communities as complicated as our own. Workers like Abram Kardiner⁽⁹⁾, Cora Du Bois⁽¹⁰⁾, Ernest Beaglehole⁽¹¹⁾ and W. V. Dicks⁽¹²⁾ use techniques to investigate the growth of 'basic personality type' or 'modal character structure'. Different perspectives may distinguish anthropologists who attach greater or less importance to psychoanalytic studies, or to investigations suggested by psychoanalysis of single personalities within a culture-pattern. An example is Prof. W. V. Dicks's examination of the Nazi character⁽¹²⁾.

Consideration of such investigations give rise to interesting speculations concerning the 'level' or 'levels' at which they were made, for belief in mental 'levels' presumably involves some kind of 'up and down' perspective. In conversation, Dr Emanuel Miller recently remarked that at times an investigator might conceivably sink a shaft into the Nazi mind too deep to explain the present differences between it and others. At a very low level, the motive forces might be almost identical in, say, most Western Europeans, while the moral differences between the typical Nazi and the typical Englishman may be caused by comparatively recent cultural and economic events in the two countries.

Superficial rather than deep differences may be the chief causes of misunderstandings between Americans and ourselves. This is suggested by some of Dr Margaret Mead's writings, especially *The American Character* (⁽¹³⁾ cf. also ⁽¹⁴⁾). The conclusion may be that spatial metaphors are not only inapplicable to descriptions of human experience, but are apt to acquire illegitimate values; such as superficial and deep, important and unimportant, good and bad. 'Lower' levels of mind if postulated are often regarded as less moral but more significant than 'upper' ones. Yet even if this metaphor be accepted, circumstances may alter cases. At present, while writing this article, I am sitting on a potential coalmine. For me it is, and for my predecessors it has long been, a lawn. It may be transformed by a coal-hungry authority, but sufficient unto the day is the fuel thereof. My house is covered superficially, in certain important places, with paint, increasing resistance to weather and attraction to buyers. So, in certain circumstances, upper levels and superficial aspects may be more important than lower and deeper ones. The application of this is obvious. In psychological thinking, 'up and down' perspective may have limitations as well as uses, like 'right' and 'left' in political thinking.

In this connexion, it may be mentioned that critics such as Gordon W. Allport, while fully acknowledging that early psychoanalysis did much to increase psychologists' interest in human beings, maintain that many psychoanalysts are interested in the person less than in explaining his experience and behaviour in terms of motive forces assumed to be common to human beings; hence their use of instinct-concepts⁽¹⁵⁾. C. G. Jung's 'collective unconscious' and Alfred Adler's 'will to power' lean heavily upon even more complicated, or vaguer, concepts of instinct. Younger psychiatrists, Karen Horney, Erich Fromm, Abram Kardiner and W. V. Dicks, explain problems of personality in terms more consonant with a culture-pattern theory, and possibly with Allport's theory of the transformation and functional autonomy of motives⁽⁶⁾. So in this field it is possible to have a wide general perspective, with subordinate perspectives, as in Ralph Linton's *The Cultural Background of Personality*⁽⁷⁾.

(c) The relation of personality to character

The last thing I wish to do would be to provoke a pointless discussion about the fifty meanings which the word Personality can convey in the English language alone, or the relation of any one of these to Character, as used in England. A tendency of any psychologist to favour one rather than another of these meanings may conceivably cast light upon his own perspective. For example, in the field of Personality investigation, an important difference of general outlook may cause two types of worker to define Personality from the respective standpoints of the 'actor' and the 'reactor'. To some, it seems essential that personality is experienced 'from inside'; to others, it is the effects which a person produces upon others which are important, and the 'self' seems a better word for the inner experiences. Strong preference for one of these points of view may, I think, reflect more than a predilection for a theory which seems practically useful, and may express significant differences in the personalities and characters of the psychologists who exhibit such preferences. Some people, if one knows them well, seem more inclined than others to accept the idea that Personality is assessed by the effect upon one's fellow-creatures, and are correspondingly undisturbed by the related idea that any individual may have a number of different personalities. In this sense, Speaking and Clothing are outstanding signs of personality. Parenthetically it may be noted that in the 897 pages of small print in the 1947 *Encyclopaedia of Psychology*, Clothing and Fashion do not appear to be mentioned.

Contrasted with this is the view that one experiences Personality. This regards Personality from the 'actor's' standpoint. Some hold—though this is largely a verbal question—that such experience could be termed awareness of Self, and William James's concept of the different Selves (empirical, social, etc.) seems to work pretty well here. Others prefer the Freudian Id, Ego and Super-Ego. Even preferences for such classifications may be symptomatic of important differences in psychologists' make-up. One wrote to me recently that in America he sometimes feels like defending solipsism, as a reaction against the definitions of personality as 'social stimulus value'.

(d) Theoretical and practical psychologists

The difference of outlook between psychologists who are much more deeply interested either in theory or in practice is common in other sciences. But if present-day applications of psychology be considered, the situation seems more complicated for us than for scientists whose subject-matter is less heavily laden with human values and value-claims. As will appear in the next few lines, it is difficult to discuss this theme without appearing to attack someone's beliefs, theories or practices. So many psychologists are ego-involved in this matter that their very natural reaction is of defence or counter-attack.

Let us take, as examples, psychological problems which confront both psychiatrists and psychiatric social workers. Since they earn their living in a certain type of community, inevitably there is some pressure upon them to accept, reluctantly or not, the values, ideals and sentiments of the social group which employs them, and the pattern into which these are woven. Should they find it difficult to do this, they run the risk of being termed, not only by their employers but also by some of their colleagues, 'insecure', 'aggressive' or even 'paranoid'. In their course of training, psychiatric social workers are warned about these difficulties and helped to surmount them in so far as they arise from the

worker's own personality and character. But some obstacles may be external, not to be swept away or diminished by any amount of psychoanalysis.

I have discussed elsewhere some problems (16,17) arising from these circumstances. For instance, as soon as war is declared by a country to which he owes allegiance, a psychiatrist may join the Forces and then be compelled to urge his patients to do, think, and believe things which, in peace-time, he would have dissuaded them from, or warned them against. When peace returns, even if he stays in the Forces, he may have to make drastic adjustments. If he works amongst rich people, he may, in part unconsciously, defer to and eventually accept their standards and outlook, while if he mixes chiefly with the poor he may take their side. Economic and social factors, as well as personal idiosyncrasies, may help to determine a particular psychiatrist's preference for the method of Freud, Jung or Adler, for group or individual psychotherapy, for physical or psychical methods of treating mental disorders, for work with a large modern firm, in a city, or a rural district. His own culture-pattern usually tends to determine his general outlook; for example, if he assumes 'aggressiveness-acquisitiveness' to be normal, healthy and universal in man.

Here are two current problems; the first well known to every psychiatrist. He may have personal complexes which make it difficult for him to deal with certain common social problems. By subjecting himself to psychoanalysis, he may reduce or abolish their influence. Yet all of us, whether we have powerful complexes or not, are motivated by attitudes and sentiments of which we may or may not be ashamed; often, indeed, we may be proud of them. They may, however, skew our judgement as much as would a partly compensated complex. For example, while we admire the ideals of early eugenists, it seems fair to say that their view of a desirable person may have been coloured by English upper-class preferences. Perhaps Sir Francis Galton might not have denied this; the point has been stated with emphasis by Prof. Lancelot Hogben.

Mr Esmé Wingfield-Stratford has remarked that had Freud taken his psychiatric outfit down a Lancashire coalmine, or on to the floor of the London Stock Exchange, he might have found that it fitted these culture-patterns less well than the Viennese milieu where he worked out his theories. Suttie, Money-Kyrle, Unwin and others paved the way for those who now emphasize that the psychiatrist's culture-pattern may influence both his theoretical and practical thinking.

It seems reasonable to urge that the average psychiatrist and psychiatric social worker might with advantage be made more clearly aware, than at present he (or she) is, of factors influencing his character-structure. Does his social status, in any particular social encounter, induce in him feelings of superiority or inferiority; or, in persons who used to be better or worse off than now, are complexes and sentiments (many of the latter entirely healthy) stimulated, reflecting their economic and social class, religious, racial and national affiliations, political attitudes, aesthetic and other preferences? Some of these factors may help them to deal with one kind of patient, and hinder them with another. Both psychiatrists and psychiatric social workers would be better for such 'social self-knowledge', which differs from that obtained by psychoanalysis. So far as I know, a technique of obtaining this, by self-observation, conversation, and discussion, has not been worked out in detail.

Vocational guidance offers chances, even temptations, to develop a special perspective. For example, during the war the successes of vocational guidance were considerable and

deserved, but though the criticism has been stated intemperately, often the 'guidance' was really direction, since the persons concerned were not free to choose.

Special 'ingredients' of his culture-pattern may influence anyone who applies psychology. The fact that there are rich and poor and its implications must be faced. A reason why one seldom reads about juvenile delinquency amongst the rich is that if it arises, parents may pay large fees for it to be dealt with inside the school. Another is that children who have plenty of play-material and space less often damage the property of others. Nowadays any town child who plays amongst bombed buildings may have to be warned not only against the risk of falling masonry, but of the danger of being accused of stealing any object which he picks up.

Perhaps I have said enough to illustrate the difficulties and challenges presented to any scientist who tries to advance knowledge and yet to maintain a wide perspective. They are particularly noticeable by any teacher of psychology. He may try to be eclectic and to fuse the teachings of different schools into a synoptic scheme to help beginners, hoping that it will eventually meet the honourable fate of all schemes which work—that it will be regarded as mere common sense. But the teacher's path is not easy, for if he spends much time in criticism, he may be regarded by students as notoriously 'anti' this, that, or the other, and 'pro' very little. Few creeds in science can be expressed satisfactorily in language comprehensible to the beginner, but to discuss this would disclose still another perspective-dilemma which bothers professors—should teaching or research come first?

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TRINITY COLLEGE, CAMBRIDGE

PERROTT STUDENTSHIP IN PSYCHICAL RESEARCH

The Electors to the Perrott Studentship are prepared to receive applications from candidates.

Psychical Research is defined, for the purpose of the Studentship, as 'the investigation of mental or physical phenomena which seem *prima facie* to suggest (a) the existence of supernormal powers of cognition or action in human beings in their present life, or (b) the persistence of the human mind after bodily death'.

The Studentship is open to any person who shall have completed his or her twenty-first year at the time when the election takes place. A Student may be re-elected once, but not more than once.

The Studentship is tenable for one year, and the Student will be required to devote a substantial part of the period of his tenure to investigating some problem in Psychical Research. The Student shall not, during the tenure of his studentship, engage in any other occupation to such an extent as would in the opinion of the Electors interfere with his course of research.

The Studentship will be of such value, not exceeding £300, as the Electors may award after considering the nature of the research which the candidate proposes to undertake. The emolument will, in general, be paid half-yearly, and the first instalment will be paid on the quarter-day on which the tenure of the Studentship begins.

The Student shall, during the tenure of his Studentship, pursue to the satisfaction of the Electors the course of research proposed by him in his application; provided that such course may be altered with the consent of the Electors. The Electors will appoint a Supervisor with whom the Student is to keep in regular touch. If the Electors shall report to the Council of Trinity College, Cambridge, that the Student is failing to pursue his course of research with due diligence, the Council may, if they think fit, deprive him of his Studentship.

Applications from candidates should be sent to Professor C. D. Broad, Trinity College, Cambridge, before 3 May 1948. In making his application a candidate should state his qualifications and claims, and his proposed course of research; he may also submit any work which he has written, published or unpublished. No testimonials are required from candidates who are graduates of Cambridge University or women students on whom a title of a degree has been conferred by that University. Other candidates must submit the names of three referees, and the Electors will not award the Studentship to any such candidate until they have had a personal interview with him.

The election to the Studentship will take place in the Easter Term of 1948, and, if a candidate be elected, his tenure will begin at Michaelmas following the election.

31 October 1947

PUBLICATIONS RECENTLY RECEIVED

Science and Freedom. By LYMAN BRYSON. New York: Columbia University Press (London: Oxford University Press). 1947. Pp. xi+191. 15s.

Here are collected a number of essays dealing with various social problems—What is Freedom? What is Science? The Nature of Social Change, Institutions, Education and so on—rather loosely held together by the notion that a good society in a liberty-loving world ought to and can be achieved through intelligent and scientific thinking. The essays are well written and readable, though many psychologists may think they run rather easily to generalization. When the inquiring reader has finished the volume, he may set himself to discover under what conditions scientific intelligence can achieve the kind of social success that is considered possible and how it works. On this quest, however, he will require different leadership and more experimental methods of approach.

The Framework of Human Behaviour. By JULIAN BLACKBURN. London: Kegan Paul, Trench, Trubner and Co., Ltd. 1947. Pp. 152. 12s. 6d.

In this book Dr Blackburn discusses the parts played by hereditary and environmental factors in forming the framework within which humans behave. He outlines recent studies of genetics and shows that innate characteristics may be modified and even, in instances, reversed by environment. Of interest to psychologists is Dr Blackburn's thesis, and the evidence for it which he adduces, that environment strongly influences scores obtained on so-called tests of innate intelligence. He shows further that the hereditarily determined characteristics usually taken as differentiating races are not only variable in themselves but are also affected by environmental influences. In fact, it appears that different environments and different cultural patterns of nation and class may be more powerful determinants of human behaviour than are hereditary factors. Since environment is relatively easy to control, Dr Blackburn suggests that by "human manipulation of framework factors" humans may in the future "be enabled to start their development along more favourable lines".

A good deal of evidence from experiments is collated in this short book and there are abundant references to enable the interested student to study in greater detail the arguments brought forward.

The Cultural Background of Personality. By RALPH LINTON. London: Kegan Paul, Trench, Trubner and Co., Ltd. 1947. Pp. xii+102. 10s. 6d.

Prof. Linton says that his study "lies at the meeting place of... Psychology, Sociology and Anthropology", but that it is mainly concerned with problems that will interest the psychologist and anthropologist. The five essays that are included deal with The Individual, Culture and Society; The Concept of Culture; Social Structure and Culture Participation; Personality; and The Role of Culture in Personality Formations. They are all on an extremely general level of argument and expression. A good many psychological readers are likely to be worried from time to time about the very sweeping and unqualified statements that are made. To take one instance only, "Both laboratory experiments and common-sense", Prof. Linton says, on p. 12, "tell us that the essence of successful learning lies in consistent rewards or punishment". No doubt in a sense this is true. But only some laboratory experiments tell us this, and only some common-sense observations and arguments support it. All the others Prof. Linton ignores. The point is of some importance because it is in general being argued that social behaviour is learned when, and because, it is rewarded by society and, apparently, not learned when it is punished. As "reward" is a kind of reaction of society towards behaviour which conforms with already established social standards, and "punishment" is the kind of reaction of society towards behaviour which fails to conform to such standards, it can be seen at once that these standards, which lie somewhere in the social background, are regarded as largely settling what the individual will or will not learn. This they do by a simple and straight application of "reward or punishment".

All the way through, in fact, Prof. Linton is making what look like simple pronouncements about complicated issues and giving very little evidence for them.

Still it is a good book to read. It is written with vigour and decisiveness. It constantly raises issues of importance in a provocative but also a perfectly fair way. As a basis for a discussion group it is a most excellent statement of views.

Personality and Problems of Adjustment. By KIMBALL YOUNG. London: Kegan Paul, Trench, Trubner and Co., Ltd. 1947. Pp. x+868. 35s.

It is impossible to give an adequate description or critical appreciation of this book within the limits of a very short notice. Prof. Kimball Young presents a highly systematic and detailed study of the basis and development of individual behaviour with special reference to the influence upon both of social culture and the institutions of human group life. He regards personality as a function of three basic variables: internal organic function and structure, external material and social situations, and the particular pattern of actions which develops as a result of the interplay of these two. In the first section of the volume he describes, with many illustrations, the basic operations of these three determining sets of conditions. In the second he considers the problems that arise when systems of action that have been developed have to be adjusted in accordance with special social influences. In the third, and shortest, he considers the implications of his views in relation to religion, art, avocations and culture generally.

The book exhibits astonishingly wide and accurate erudition. It is, however, exceedingly diffuse, so that probably few students will have the time to read all of it. Though the writing is clear it is not very striking, little stands out from a general high level. As a volume to be used for consultation it should be in every well-equipped psychological library.

What People Are: A Study of Normal Young Men. By CLARK W. HEATH *et al.* Cambridge, Mass.: Harvard University Press (London: Oxford University Press). 1946. Pp. xvi+141. 11s. 6d.

As a record of a comprehensively planned and ably executed pioneer investigation, this book will be of the greatest interest and service to the psychologist, the medical man, to certain physiologists and anatomists, and to all people who are concerned with social welfare. What the investigation has achieved or, more accurately, will eventually achieve cannot yet be estimated, and the authors are themselves very frank and definite about this; they "make no pretence that this is completed work or that they have the answers to the many important problems which they have presented".

In 1938 the Grant Foundation was established at Harvard University "for the study of normal persons". Section I contains an interesting brief discussion of normality and one or two qualitative definitions of which the most important is: "The 'normal' individual here is regarded as the *balanced* person whose combination of traits of all sorts allows him to function effectively in a number of ways." It is clear, however, that normality was in fact empirically determined for the purposes of study. In three successive years a group of second-year Harvard students was selected on the basis of (1) opinions of Deans, (2) health records and personality estimates, (3) a minimal standard of excellence in pre-college academic ratings. There were 252 of these in all, and they obviously form a somewhat pre-selected kind of 'normal' group.

These were systematically studied (a) by psychiatrists in what is called "Description of Normal Personality"; (b) in socio-economic terms, by records of birth, nationality, race, family history, financial status, schooling, summer activities, social background and home life, college interests and aims, and reaction to University life; (c) by records of morphological details; (d) by physiological function; (e) by medical data, especially temperature distribution, blood counts and records of surgical operations, and (f) by psychological tests, predominantly of intelligence.

The traits dealt with are tabulated, related and grouped and the results are clearly set forth in a number of interesting and suggestive tables.

It is noteworthy that the only genuinely experimental approach among all these is that of the physiologists. This is perhaps a pity, for it leaves the issue somewhat clouded by a large but wholly unknown amount of subjectivity.

However, criticism at the present stage is premature. The plan is "to follow the careers of participants for fifteen or twenty years or more". It is a magnificent plan, and it is earnestly to be hoped that the present early but very important report will receive such a wide and understanding welcome that the team of workers whose enthusiasm and devotion have produced it will be encouraged to proceed with vigour.

Studies in Genius. By WALTER G. BOWERMAN. New York: Philosophical Library. \$4.75.

Most reasonably well-read people have at some time dipped into or read with care Havelock Ellis's *Study of British Genius*. Here is an American counterpart, built on the same plan, derivative in many ways, as the author himself points out, but nevertheless the fruit of many years of patient and original investi-

gation. People of genius are said to belong to four classes: the creative, the scholarly, the critical and the expansive. Necessarily, as in the British counterpart, the geniuses represented and studied in this book are a selection, carefully and judiciously extracted from among those that the communities immediately concerned have thought worth writing about in some detail. Hence a good deal of the interest of the record lies in its reflection of standards of worth which have become socially accepted.

However, there is a tremendous lot of interesting and significant information of value to the social scientist, the student of heredity, the psychologist whether normal or abnormal, and the historian, all set forth clearly, and with considerable humour. This book is likely to become a classic in its field.

Aging Successfully. By GEORGE LAWTON. New York: Columbia University Press (London: Oxford University Press). 1947. Pp. xiv + 266. 15s.

"Many of the ideas in this book", the author writes, "received their baptism of fire in the course, 'Aging Successfully', given during 1945-6 in the Adult Extension Series of the Division of Social Philosophy, Cooper Union, New York. The several hundred students ranged from a boy of ten, who willingly or unwillingly accompanied his grandparents, up to men and women in their eighties... Glamor girls sat next to dowagers; and ragged cloth coats rubbed against mink. 'Growing older' was truly the theme, not merely 'old age', and the student talked up and at the instructor." Probably this quotation will indicate the general character of the book. It is really a discussion, rather a lengthy one, for readers who like good advice, lots of little stories, an air of great certainty. There seems no particular reason why it should have been written by a psychologist. On the whole, however, it is sensible, and unlikely to do any harm.

Child Psychology. By ARTHUR T. JERSILD. Third Edition. New York, Toronto and London: Staples Press, Ltd. 1947. Pp. xi + 623. 30s.

This edition has been considerably revised from its successful predecessors. In particular, more attention is given to "what a child's overt behaviour reveals about his private thoughts and feelings", and to social influences upon child life. References to the literature have been brought up to date, but it is likely that most busy readers will find that the reading lists are not sufficiently selected to be of much use to them. The book is addressed to students who are attempting a comprehensive and systematic study, but it will also be of value to persons with special interests who want to get an introduction to specific problems of child behaviour. It is very well informed indeed, and though it lays much stress upon general principles, it presents on the whole an admirable picture of recent and important experimental research.

The Anatomy of Lango Religion and Groups. By T. T. S. HALEY. Cambridge University Press. 1947. Pp. xii + 207. 21s. net.

The main object of the writer of this book was to analyse carefully the types of social group existing in a primitive society. He chose the Lango, a nilotic tribe which had migrated to central Africa. He has written a careful and detailed description of the tribal, clan, family, religious and territorial groups and their inter-relationships; and of how by cutting across or uniting with one another, the different groups have yet remained closely linked, bound together by their religious beliefs and magical ceremonies. The author's original purpose was to develop a parallel between the partial breakdown of this system, resulting from contact with Christianity and with British administration and education; and the formation, maintenance or breakdown of social groups in European civilization. This latter aim he was unable to accomplish, though it is to be hoped that he may some day be able to do so. In the meanwhile, he has produced a careful, intelligible and interesting discussion of the social customs of the Lango tribe, which should be of great value to the social anthropologist and psychologist. An excellent index and glossary of Lango words is appended.

Abnormal Psychology: A Clinical Approach to Psychological Deviants. By JAMES D. PAGE. New York and London: McGraw Hill Publishing Co., Ltd. 1947. Pp. xvii + 441. 20s.

This is a systematic text-book suitable for the general student who has already some background of knowledge of normal psychology. It covers very well practically the whole field of psychopathology. Nevertheless, it is interesting to read, very clear, with adequate illustrative case material, well-selected references and a valuable glossary of terms. Naturally every reader, in accord with his particular interests or with the knowledge that he brings to his perusal, is likely to find a good many matters as to which he desires more, or better, evidence, and some as to which he could manage with less. But that is harmless criticism. The book as a whole is an extremely good one and should attain wide use.

Mental Health. A Practical Guide to the Disorders of the Mind. By J. H. EWEN. London: Edward Arnold and Co. 1947. Pp. 270. 12s. 6d. net.

The pattern of this book is the customary one for elementary text-books of psychiatry. There is a useful chapter, written by Dr C. Friedman, on special methods of treatment (E.C.T., hypoglycaemia, leucotomy, etc.). The exposition of psychopathology, which is derived from McDougall mainly, and the accounts of the principal syndromes, are vague and out of date.

Sigmund Freud: A Presentation of his Theory and a Discussion of the Relationship between Psycho-Analysis and Sociology. By WALTER HOLLITSCHER. London: Kegan Paul, Trench, Trubner and Co., Ltd. 1947. Pp. viii+119. 8s. 6d.

Anybody who shares the belief of the author that "the sociologist in so far as he takes an interest in the psychological mechanisms of the human beings whom he treats, cannot dispense with a thorough knowledge of psycho-analytic psychology", will find this book very useful. The writer gives a clear, concise and reasonable exposition of Freud's opinions and beliefs about individual psychology. He pays some attention to criticism, but not very much. He also suggests some ways in which the sociologist will find his knowledge of Freud of value.

Nervous Stomach Trouble. By JOSEPH E. MONTAGUE. Kingswood, Surrey: The World's Work (1913), Ltd. 1947. Pp. xii+356. No price given.

A medical man here writes about: (1) "How to overcome indigestion and gastric disorders without resorting to drugs or quack nostrums"; (2) "How to organise your brain, your nerves and your stomach into one smooth working unit, thus insuring a longer and happier life." It sounds terrific, but it is pretty good none the less, if people are really bothered about these things. The writing is extremely popular in style and there is rather a lot of it. Still it is technically well informed; the psychology, of which there is not a little, is mostly good common sense; it is not scaremongering, and it is not likely to influence anybody who is genuinely in need of medical treatment to try to get along without it.

The Place of Psychology in an Ideal University. The Report of the University Commission to Advise on the Future of Psychology at Harvard. Cambridge, Mass.: Harvard University Printing Office, etc. 1947. Pp. 42.

Everybody who is interested in the future of psychology anywhere in the civilized world ought to read this report. If he is friendly to the development of psychological studies he will find an immense amount to stimulate and encourage him, to whatever extent he may agree or disagree with the proposals set forth. If he is doubtful and critical he will find a fair and lucid statement of the case to which he must find an answer. The report comes from a very strong and influential committee, mainly but not wholly composed of leading American psychologists and led by Dr Alan Gregg. Every English reader will speedily realize that the 'ideal university' they have in mind is ideal American, fitted to American culture and developing out of the present American University situation. But besides making recommendations, many of which are certainly directly determined by the facts of current American practice and ideals, the report surveys the Nature and Range of Psychology and the Purposes of Psychology in a University which are applicable far beyond the American scene. The general upshot is that psychology should be recognized as having a vastly greater part to play in both general and specific University training than is at the moment admitted to be desirable anywhere, and that serious attempts should be made to bring all its varied interests into a more effective working unity. To some it may appear that proposed wide extensions of training and teaching may run some risk of pushing the extremely urgent need for a free and broad development of original research somewhat into the background. Also it is perhaps a little regrettable that the committee did not seriously consider the problems of the relations of psychology in their ideal university with its organization in other universities less ideal or different in their cultural setting. The fact remains that this is an exciting report which should put heart into psychologists everywhere.

